JOHN S. HOUGHTON.

S.

I received yours of 16.th instant together with the Workemens report, & the Section of the Divinity Schole, & an account of the Decayes; by all which I am confirmed that the Buttresses are not sufficient to poyse soe heavy and flat a Vault having the Bayes soe wide, I meane they are not weighty enough to resist the force in the place where it is properly to be resisted. I can thinke but of two waies to amend this originall fault of the Architect: One is by Smiths worke to Brace the opposite Buttresses together, as the Workemen haue proposed, but how to doe this the surest way requires some consideration.

The Girders of the floor of the Library are old, and possibly some of them swayed down, if not broaken, by the weight of the Classes & Bookes (which it may be are more then in former dayes when learning was lesse bulky) and soe crush the Vault by pressing the Stone worke; and this may be the reason, why that which hath long stood well should now shrinke under its burden. I am loath to advise the moving of the Bookes & Classes, but I thinke it can hardly be avoyded, but certainly the Floor must be searched, and noe Girders should touch the Vault; & if the Girders are anchored to the walls (supposing them to be sound) it will still stretch a litle, as the rust of the Iron lessens the key and widens the hole in the timber, and a litle depression will be enough to presse upon the Vault.

The substantiall way will be to brace each opposite buttresse to one another by two Rods of Iron keyed together upon the outsides or Backs of the Buttresses, these must be good Swedish Iron inch & halfe square, three lengthes will reach over: The skill of the Smith will be to make the Joyntes as trew as a Joyner would make them in wood, leaving a litle liberty for the keys made wedgewise to draw a litle, and bind all to the Crosse barres upon the Backs of the Buttresses; The Table annexed sufficiently describes the fashion: by such methods I braced the lofty Spire of Salisbury, after the Lightning had rent it with Cracks of 200 foot long; patternes were first made exactly in wood of the full bignesse, which were wrought at Porchmouth by Anchorsmithes, who haue the best skill to make great Iron worke sound: Iron is a fallallous thing the barres as they come from the Mill are full of Cracks & unequall partes within, which often appear not to the Eye, and are only closed by great fires, and repeated blowes of many sledges working together & falling quick like a peale of Bells; I haue found some partes of the same Barre of treble the strength of other partes, yet all sound in appearance.

I haue considered another way to be performed by the Mason, & I thinke it may be the cheaper. I am told the north side stands upright, but the stiffer that standes, the more is the burden thrown upon the South Buttresses, wch you say are lesse & weaker then the other, I would therfore giue them equall strength with the other, after this maner;

Having shoared the Rib of the vault, and the outside of the Buttresse, I would dig a new foundation beyond the Buttresse, at some feet distance according to the ground, & ramming the bottom, I would worke up a solid masse of square stone with even beds throughout without filling, from which I would turne a Ramping Arch against the buttresse; all this under ground; then upon the key stones of this halfe Arch I would rayse an additionall buttresse

about

about 12 foot above ground & four foot out and as broad as the old buttresse: the workmen will suppose that the new work ought to be bonded into the old, but this I forbid, least it should hang upon the old, & tend to draw it more out of its perpendicular; my intention is, that the new work standing upon its own foundation at a distance from the old foundation, should as it were rest against the buttresse, & resist the force of the Vault, setling of it selfe, by an upright Joynt. This being diligently performed upon the 4 midle buttresses of the South side, you may with shells & plaister of Paris wedge up all the Cracks of the Vault securely. If I had not been acquainted with the Opiniatrity of Workmen I should not have been soe prolix in this discription to a person, who hath given soe ample proof of his sagacity to the learned World. I am with all respect

S. Your most humble Serv.t
Chr. Wren

My humble service to Mr. Vicechancell[r] and my Brother Wallis, to whom & such ingenious persons as your selfe this is submitted.

July 23d
1700

Sir Christopher Wren's Letter to Dr. Gregory. (From the Bodleian Library.)

On the Bicentenary of Sir Christopher Wren's death a Commemoration Service was held in St. Paul's Cathedral, when an Address was delivered by the Dean of St. Paul's (the Very Rev. W. R. Inge, D.D., C.V.O.), and wreaths were afterwards laid on Sir Christopher Wren's tomb in the Crypt by the President of the Royal Institute of British Architects (Mr. Paul Waterhouse, M.A.) and by representatives of the Architects of France and of the United States of America.

Sir CHRISTOPHER WREN

A.D. 1632-1723

Bicentenary Memorial Volume published under the auspices of the Royal Institute of British Architects.

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VIRI
TAM SINGVLARI INDOLE PRAEDITI
TANTO STVDII AMORE STIMVLATI
VT
PRAESTANTIA EIVS IN SCIENTIA VNIVERSALI
AEQVALEM
VIX NISI EX TOTIVS ARCHITECTVRAE
INCOMPARABILI EIVSDEM PERITIA
INVENERIT
CVIVS ANTE SEPVLCRVM

HAEC LAVREA

PIETATIS ERGA TAM EXIMIVM INGENIVM
SEMPER INTER POSTEROS VIGENTIS
SVMMA OBSERVANTIA PIGNVS DEPONVNTVR
NOS ARCHITECTI
ANIMAE REQVIEM ORAMVS
HONOREM PERPETVO CRESCENTEM
COLIMVS
EXEMPLAR CVRABIMVS TVENDVM
A.D. IV. KAL. MART. A.S.N. MDCCCCXXIII

EDITOR'S NOTE. *By Rudolf Dircks, Librarian of the Royal Institute of British Architects.*

THE object of this book, as Sir Aston Webb states in his Introduction, is to pay a tribute to the memory of Sir Christopher Wren on the Bicentenary of his death. The contributors have given voluntarily and freely their time and their scholarship to the purpose of appreciation and exposition. The tribute is further strengthened by the generous action of Messrs. Richard Clay & Sons, who have made arrangements which ensure that the entire profits derived from the sale of the volume shall be devoted to the St. Paul's Preservation Fund.

Although the contributors to the volume have dealt with Wren's life and work from different angles, a certain degree of repetition concerning the outstanding facts and circumstances of his career has been inevitable.

My task as Editor, a position which I was invited to occupy by the Sir Christopher Wren Bicentenary Commemoration Committee, is largely to express my thanks for the helpful assistance which has been given to me by Mr. Henry M. Fletcher, M.A., F.R.I.B.A., the Chairman of the Executive Committee, Mr. W. Henry Ward, M.A., F.R.I.B.A., F.S.A., a member of the Committee and one of the principal contributors to the book, and by Mr. L. H. C. Collins of Messrs. Richard Clay & Sons. I should wish, further, on behalf of the Bicen-

tenary Committee, to acknowledge the courtesy of Sir Charles Oman, M.P., K.B.E., the Librarian of All Souls' College Library, Oxford, Dr. A. E. Cowley, Bodley's Librarian, and the Master and Fellows of Pembroke College, Cambridge, for permission to reproduce original drawings and documents preserved in the archives of these Colleges. Thanks are also due to Professor Beresford Pite, Hon. M.A. (Cantab.), F.R.I.B.A., for the pen drawing of St. Paul's Cathedral which he has specially made for the book. The illustrations of the portraits by Sir Godfrey Kneller and Michael Wright, and the portrait bust of Wren by Edward Pierce are taken respectively from the originals in the collections of the National Portrait Gallery, the Royal Society and the Ashmolean Museum ; while the resources of the British Museum and the Royal Institute of British Architects have been freely drawn upon for further illustrations. Messrs. B. T. Batsford, Ltd., the architectural publishers, and Messrs. Ellis and Smith of Grafton Street have also contributed to the illustrative value of the book by granting permission to reproduce prints or drawings in their possession.

*** Owing to the exigencies of binding, it has not always been possible to place the illustrations in close relation to the text. In such instances readers should refer to the List of Illustrations, which is arranged alphabetically.

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Plate facing p. 66, *for* St. Austin's Church *read* St. Augustine's Church.
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Sir Christopher Wren's Favorite Design, *for* p. 206 *read* p. 55.

INTRODUCTION. *By Sir Aston Webb, K.C.V.O., C.B., F.R.I.B.A., President of the Royal Academy.*

THIS book, consisting of sixteen chapters, produced under the auspices of the Royal Institute of British Architects on the occasion of the Bicentenary of the death of Sir Christopher Wren, is a small tribute of admiration and gratitude for the genius and work of the greatest of our English architects.

The various chapters have been written by those especially well qualified to treat of the particular side of Wren or his work that they deal with, and should there be any slight discrepancies in these chapters, let them be put down to the many-sided abilities of this great man and the varied views necessarily held by the authors themselves.

Those desiring further information beyond the scope of this book, may be referred, among much other material, to the "Parentalia" by Stephen Wren, 1750; "Life of Christopher Wren" by James Elmes, 1853, and "Sir Christopher Wren" by Lena Milman, 1908, to all of whom I am indebted.

The following chapters show Wren as an outstanding genius with imagination, great curiosity of mind and power of invention, with at the same time a genial and placid temperament that enabled him lightly to dismiss trials and disappointments, of which he had many, together with the power at once to turn

his hand and mind to some other interest. Even as a comparative youth Evelyn and other contemporary writers speak in the highest terms of his "incomparable qualities."

He had the gift of making friends among highly intellectual people of all parties and keeping them. Later in life this faculty stood him in good stead and enabled him to surround himself with a remarkable group of craftsmen which he employed on all his buildings—painters, sculptors, masons, carvers, joiners, metal-workers, and others.

A Royalist by tradition and upbringing, he was first of all an artist by nature and at heart. It was the intellectual qualities in the man that attracted him—the political views the man held, apparently not at all. It was this characteristic that enabled him, while his uncle, the Bishop of Ely, was in prison by Cromwell's orders, to form a close friendship with Claypole, Cromwell's Master of the Horse.

Up to the age of thirty there is little evidence that he gave much, or indeed any, attention to architecture, but he busied himself, in addition to his astronomical studies, with scientific research and invention. Many are the inventions that were suggested by him, though the credit is given to others who did the more mechanical part of perfecting them. On the other hand, he has been credited with the invention of mezzotint engraving, an art he experimented in, though its discoverer was probably a German, Ludwig von Siegen.

The story of Wren's visit to Paris at the outbreak of the Plague, his meeting with Bernini and Mansart, the impression that the Louvre and the architecture of Paris generally made upon him will be found in the following pages.

At the end of six months (February 1666) he was urgently summoned back to England to report on the repair of Old St. Paul's, and while doing this he was regularly attending the meetings of the Royal Society, then mainly engaged in considering how a return of the Plague could be diverted.

In September of the same year came the Great Fire, and Old St. Paul's and the City of London with its fifty churches were destroyed. Ten days after the outbreak Evelyn records showing his design for the rebuilding of the City to the King, only to find that Wren had already submitted a scheme—a fine example of Wren's energy and alertness, though it is permissible to suspect that perhaps both plans would have been improved by a little longer preparation. Neither scheme was carried out, but in this great national emergency the King naturally turned to Wren and appointed him Surveyor-General and architect for " repairing the whole City, the Cathedral Church of St. Paul's, all the parochial churches with other public structures," and so the main business of his life began. And wonderful to say, in spite of immense difficulties, he lived to see it through, all of which is told in some detail in the following pages.

Impressed through his visit to Paris with the grandeur of a dome as a dominating feature of a great public building, he conceived a great dome for St. Paul's, and prepared a plan and model for a Cathedral on the plan of a Greek cross, but this was quickly rejected, to his lasting regret; his equable temperament, however, once more prevailed, and after listening patiently to the conflicting ideas and desires of the authorities, he finally produced the design which, with certain variations, was erected, and one of Christendom's finest

churches was the result, the erection occupying the greater part of the remainder of his life.

This is not the place for any detailed account of Wren's buildings. He is credited with the rebuilding of some fifty-two City churches, with an unlimited fund of resource and invention. Some show the hand of the master more clearly than others, many are on inconvenient and cramped sites, but the difficulties were usually used as opportunities for special treatment, producing unexpected effects which will generally be found to have arisen quite naturally from the plan and surrounding limitations.

Wren, the artist and scientific man, selected all his materials with care, and as far as possible they were English products. He was a great believer in Portland stone and English oak, of which his buildings are mainly constructed; and time has proved the wisdom of his choice. He paid the same attention to the placing and laying out of the surroundings of his buildings as to the design of the buildings themselves. He returned from his French tour with his mind filled with the French Renaissance, and with this experience and the severer work of Inigo Jones before his eyes, he evolved a manner of building distinctly his own and distinctly English, which influenced English architecture far into the Georgian period, and was only finally lost in the strong wave of the Gothic revival.

His scientific training led him to search for true proportion in all his buildings, and after laying down the general lines of his designs, he left scope for the craftsmen he had trained to exercise their own individual taste and feeling.

Like the mediæval builders, he built in his own

way, without any attempt to adopt the manner of surrounding buildings. His first complete work—Pembroke Chapel, Cambridge—was placed in a mediæval quad; his great front of Hampton Court Palace masks Wolsey's building; and he laid out the gardens and park to accord with his own building in a manner worthy of Lenôtre himself, and, it may be added, to the perpetual joy of succeeding generations.

The two outstanding facts in his architectural career appear to be, first, that his early education was mainly scientific, and that he did little or no architecture till he was thirty; and secondly, that he knew little or nothing of Europe beyond Paris; but then he was a genius, and therefore no general guide for others, though it may make us pause and consider whether a scamper over the Continent and a superficial knowledge of all the various modes of building abroad are necessary accomplishments for an architect building mainly in England.

After his appointment as Surveyor-General little of general interest appears to be known of his life apart from his work. He was twice married, and by each wife he had two children—three sons and one daughter. Each wife died shortly after her second child was born, and the daughter looked after her father while she lived, but she died twenty years before him.

Wren took his share in public work in many ways; he was one of the founders of the Royal Society and its President (1680). He was a Member of Parliament successively for Plympton, Windsor, and Weymouth. He was a great Londoner, and during his time he was consulted on all matters connected with London, though—as still happens—the advice given was not

always taken, and he never ceased to regret the lost opportunity for rebuilding London.

The Cathedral Church of St. Paul and the towers and spires of the City churches, Hampton Court and Greenwich Hospital are his great gift to London, and remain the glory and pride of all Londoners and Englishmen.

Views of London are to be found all over the world, and would not be considered complete without the dominating and satisfying dome of St. Paul's over all. The building of it occupied about forty years of Wren's life (from 1675 to 1710), and it is a somewhat unique fact that the same architect should have designed, superintended and lived to see the completion of a Cathedral of the first class, with no alteration of his design by other hands.

Its erection was not carried out without anxieties and disappointments—no such undertaking could be. It took Wren some five years to clear the site of the ruins of old St. Paul's, and still longer to settle the design with the Church authorities; they wanted a Gothic plan and the architect a Renaissance one. This settled, there must have been anxious thought and calculations as to the weight and thrust to be dealt with in balancing a dome weighing some 50,000 to 60,000 tons on eight piers or legs. The foundations, too, were not free from anxiety, as is explained in detail later on. Subsidences occurred causing cracks in the structure which have never been permanently rectified. Money for the work was also frequently difficult to obtain, and towards the end, Wren's friends having mostly died, jealousies arose which much embittered his last days, but his happy temperament stood him in great stead, and on his retirement to his house

at Hampton Court he returned to his old love of Science and busied himself with many inventions, passing away in his sleep on February 25, 1723.

Since then St. Paul's has had a distinguished list of architects, or surveyors as they are called, to look after the structure, and they have testified their admiration and astonishment at the genius and skill of the design.

Quite recently a Commission mainly composed of distinguished engineers has been examining the structure with minutest care, and though they have not completed their labours, and fear much cost will be entailed in safeguarding the structure, they have expressed (what I think would have given Wren much satisfaction) their unbounded admiration of the scientific skill employed in the design; and so artists and scientists of to-day agree in their admiration of the wonderful work and unquenchable genius of

SIR CHRISTOPHER WREN.

SIR CHRISTOPHER WREN FROM THE PERSONAL SIDE. *By J. Alfred Gotch, F.R.I.B.A., F.S.A.*

WE have it on the authority of the letter that brought disaster on Malvolio, that "some men are born great, some achieve greatness, and some have greatness thrust upon them"; and although the authority is no higher than that of a clever waiting-woman, our own observation confirms her assertion. Of Sir Christopher Wren it may be said that he obtained distinction by all three methods. He was born great, he achieved greatness, he had greatness thrust upon him. Not in the domain of the court or of politics, which was the kind of greatness that Maria, the waiting-woman, had in mind, but in the nobler fields of Philosophy and Art. Many great men have had an obscure and unilluminating childhood; Wren was remarkable from his infancy upwards; he was born great. That he achieved greatness his works do show; and it is no straining of language to aver that he had greatness thrust upon him, if we remember that without solicitation on his part, so far as we know, and without his undergoing previous training in architecture, the appointment of Surveyor of the King's Works was conferred upon him, an event which, in combination with the unexpected calamity of the Great Fire of London, gave him the opportunity of displaying his genius in those great works of architecture by which

he will always best be known. Yet, be it borne in mind, before he became an architect he was already a scientist of European fame, a compeer of Harvey and Newton. His genius had been displayed in many directions; in scholarship, in mathematics, in astronomy, in experimental philosophy, in some departments of medicine. Only in literature and music had he not made a mark, and we can well believe that in these also he would have excelled had leisure permitted him to turn his versatile mind to them.

As Pope "lisped in numbers," so Wren lisped in Latin, which was not so surprising in those days as it would be in these. On New Year's Day 1642 (N.S.), when he was nine years old, little Christopher sent his father a dutiful Latin letter and a copy of verses in Latin and English. Leaving the Latin version aside, the English runs thus:

"To you, Deare Sir, your Son presenteth heere
The firstfruits of his pains and of the Yeare;
Which may (though small) in time an harvest grow,
If you to cherish these, your favour shew."

One has heard better verses, but hardly from a child of nine. The handwriting, too, is as precocious as the matter; it is firm, regular and elegant, but obviously executed slowly and with great pains. This youthful effusion must have pleased and surprised his father, for the latter has written a note at the foot of the paper, in Latin, saying that this was written in the tenth year of his age, as from October 20th. The original has been preserved and handed down in the family, and is interleaved in the Institute's copy of "Parentalia," which belonged to Wren's last descendant.

The "Parentalia" is an account of Wren's life and

works compiled by his son Christopher, and edited and published in 1750 by his grandson Stephen. There are also included lives of his uncle, Matthew Wren, Bishop of Ely, and of his father, Dr. Christopher Wren. This book is the principal source of information about Sir Christopher, but it is provokingly silent as to his domestic life; it does not even mention his marriages, although he afforded two opportunities for such a reference. These gaps, as well as others, have been filled by later writers, but in spite of all, there is a singular dearth of information from which a picture of his home-life can be drawn. We know that he was delicate as a child, although he lived to be ninety-one. We might have expected to catch some echo of childish laughter or boyish romps, but all we learn is that in his ninth year, when, like other children, his thoughts might have been occupied with his New Year's presents, he wrote his father that dutiful letter, a sort of homily in Latin on the fruits of parental love. "There is a common saying among the ancients," he writes, "which I remember to have had from your mouth: there is no equivalent that can be given back to parents. . . . But these precepts so often repeated impel my mind towards good things and virtue." The words he uses are "ad bonas Artes et Virtutem," and whether he meant general good behaviour or intended a special reference to the liberal arts, his words were prophetic. Such a letter in these days would indicate a most objectionable priggishness, but with Wren it was not so, for all the evidence goes to show that throughout his life he was a simple, grave and modest person. That he was unusually gifted even in early years is confirmed by Evelyn, who went to see him twelve years later at Oxford, and speaks of him as "that

miracle of a youth" and "that prodigious young scholar."

Young Christopher's father, also named Christopher, was a man of mark, and so was his Uncle Matthew. The latter was successively Dean of Windsor, Bishop of Hereford, of Norwich and of Ely. He was a great friend of Laud's, and was himself of a masterful disposition. It is not surprising, therefore, that he incurred the hostility of the Puritan party, and suffered deeply during their ascendancy. It is unnecessary to go more fully into his history; suffice it to say that he was a man who occupied some considerable space in the public eye. His younger brother, the father of Christopher, although not so prominent, was an accomplished and learned man. At the time of Christopher's birth he was rector of East Knoyle in Wiltshire, having moved thither from the neighbouring parish of Fonthill Bishops, where he had met his wife, Mary, daughter of Richard Cox of Fonthill. Of this lady we know next to nothing, and are unable to say whether it was from her, from his father, or from both that the son derived his unusual qualities. There was a family of seven, of whom Christopher and three sisters grew up. Of the sisters only one is of interest; this was Susan, five years his senior, who married at the age of sixteen the Rev. William Holder, a good mathematician and skilled in music. This brother-in-law soon perceived Christopher's ability and grounded him thoroughly in mathematics, but found the soil, we may suppose, unfertile in regard to music.

The father succeeded his brother, Matthew, in the Deanery of Windsor and the Registrarship of the Order of the Garter, retaining, however, the rectory of Knoyle, and subsequently accepting that of Great Haseley, near

Madam

The Artificer having never before met with a drowned Watch; like an ignorant Physician has been soe long about the cure, that he hath made me very inquisit that your comands should be soe long deferred. However I have sent the Watch at last & envie the felicity of it that it should be soe neer your Eies & soe often enjoy your Eye, & be consulted by you how your time shall passe while you employ your hand in your excellent works. But have a care of it for I have put such a Spell into it that every Beating of the Ballance will tell you, 'tis the pulse of my Heart which labours as much to serve you and more truely then the Watch; for the Watch I believe will sometimes lie & sometimes perhaps be idle & unwilling to goe, having received soe much injury by being drenched in that briny bath, that I dispair it should ever be a true Servant to you more: But as for me (unless you drown me too in my teares) you may be confident I shall never cease to be

June 14th.

Your most affectionate
humble Servant

Chr: Wren

I have put the Watch in a Box that it might take noe harme, & wrapt it about with a little Leather, & that it might not jog, I was fain to fill up the corners either with a few Shavings or wast paper

Facsimiled Letter from Sir Christopher Wren (dated June 14th, but with no year) to Faith Coghill, who later became his Wife. (From the R.I.B.A. Collection. Heirloom Copy of "Parentalia.")

Oxford. He, too, had scientific acquirements and became an early member of the Royal Society. He had, moreover, a leaning towards architecture, which he displayed in the decoration of the chancel at Knoyle with plaster-work containing flower-borders, figures and texts of Scripture, all of which gave great offence to rigid Puritans in later years. His knowledge of architecture was indeed sufficient to induce Charles I, in the somewhat haphazard fashion of the times, to employ him in making an estimate, and presumably a design, for a considerable building at Windsor in order to improve the Queen's accommodation. Although the scheme never matured, the estimate, amounting to over £13,000, was prepared in some detail and is signed by Christ. Wren, and dated May 15, 1635, a few weeks after his appointment as Dean. We find, therefore, in the father some of the qualities which distinguished the son in a much greater degree. The sister, Susan, was also a clever woman, for, according to Aubrey, she had "a strange sagacity as to curing of wounds, which she does not doe so much by precedent and receipt bookes as by her own excogitancy considering the causes, effects and circumstances." * This excogitancy she once brought to bear on no less a person than King Charles II, who had hurt his hand. The doctor could do nothing, so at eleven o'clock at night, being informed that Mrs. Holder was in the house, the king sent for her; she made a poultice which gave sudden ease and induced a good night for the royal patient, and she soon completed the cure, to the great vexation of the faculty.

It must have been shortly after the writing of the

* Milman, p. 12.

New Year's letter by the child that he was sent to Westminster School and its famous head master, Dr. Busby. There are no records of his career at that seat of learning, but he evidently turned his attention, or had it turned for him, towards science, as a foundation for which he had already received a good training in mathematics. In November 1645, when he was just over thirteen, he dedicated to his father (in Latin verses) an astronomical instrument which he calls Panorganum astronomicum. What this may have been astronomers can perhaps tell us; they have not yet done so. Nor has anyone else explained it. Its purpose was to track the path of the heavenly bodies and show their effect on the recurring seasons of the year and its lesser divisions. Inserted in the special copy of "Parentalia," in close juxtaposition to the original of the dedication, is a drawing of a woman steadying a globe in one hand and holding in the other a circular disc. But whether this represents the Panorganum is not disclosed. The explanation matters but little; what is of significance is that a boy of thirteen should have evolved anything of the kind. What "callow offspring," as he calls himself, of the cleverest father has elsewhere at the age of thirteen been known to grasp the complexities of the causes which produce the measures of time known as the year, the month, the day, and graphically to illustrate their co-ordination in a single instrument?

In the following year, 1646, he went to Oxford and was admitted a gentleman-commoner of Wadham College, of which the Warden was the famous Dr. Wilkins, husband of the Protector's eldest daughter. About a year before this there had been instituted in London a weekly meeting of learned men, among whom were Dr. Wilkins and Dr. Wren, the Dean, at

which were discussed questions of natural philosophy, and what was called the new, or experimental philosophy. This was the beginning of that famous body, the Royal Society, which has maintained its pre-eminence till the present day. At first the meetings were held at various places, some being at the house of one of the members, Dr. Goddard, because a workman of his was skilful in grinding lenses. Then some of the members moved to Oxford, and while the meetings in London still continued, others were held by the Oxford contingent. To these young Christopher, notwithstanding his youth, was readily admitted, and he became acquainted with some of the foremost thinkers of the time. To them, and later to the Royal Society, from time to time and throughout his life he submitted ideas, suggestions and inventions of his own. There are long lists of these in "Parentalia" from which a few may be selected as showing his versatility and his forestalling, in a tentative way, the inventions of modern times.

A weather-clock (which automatically registered changes in the weather).

An artificial eye, with the humours truly and dioptically made.

To write double by an instrument.

Several new ways of graving and etching.

A pavement harder, fairer and cheaper than marble.

New designs tending to strength, convenience and beauty in building.

New ways of sailing.

Ways of submarine navigation.

To perfect coaches for ease, strength and lightness, etc.

Venerande Pater,

Sententia apud antiquos vulgata est, quam ex ore tuo me habuisse memini, Parentibus nihil posse reddi æquivalens. Frequentes enim curæ, et perpetui labores circa pueros, sunt immensi quidem amoris indicium. At præcepta illa mihi toties repetita, quæ animum ad bonas Artes, & Virtutem impellunt, omnes alios amores superant. Quod meum est, efficiam, quantum potero, ne ingrato fiant hæc munera. Deus Optimus Maximus conatibus meis adsit, et Tibi, pro visceribus illis Paternæ pietatis, quæ maximè velis, præstet. Id orat.

Filius tuus

Tibi omni obsequio devotissimus
Christophorus Wren

Has, tibi primitias Anni, Pater, atq; laborum
Præsto (per exiguas quālibet esse sciam)
Quas spero in messem posse olim crescere, vultu
Si placido acceptes tu, foveasq; sinu.

To you, Deare Sir, your Son presenteth heere
The first fruits of his pains, and of the Yeare:
Wich may (though small) in time an harvest grow,
If you to cherish these, your favour shew.

E Musæo meo
Calendis Januarij
1641.

Facsimiled Letter from Sir Christopher Wren to his Father, the Dean of Windsor, when he was nine years old. (R.I.B.A. Collection. Heirloom Copy of "Parentalia.")

* Scripsit hoc. Ao. Ætatis suæ, Decimo, ad Octobris 20: elapso:/.

A.

D

Among the more important of his later contributions were experiments in the infusion of liquids into the blood of animals, and his help in the invention of the barometer. These can only be lightly touched upon. With regard to the latter, barometrical changes had been already observed by Torricelli on a somewhat clumsy instrument of his own invention. These changes were at first supposed to be induced by the movement of the moon. It appears to have been Wren who suggested that they may have been due to the varying density of the atmosphere, which proved to be the case.

The infusion of liquids into the blood led to the practice among physicians of the transfusion of blood, and indirectly to the modern practice of hypodermic injection. Wren describes his first experiment in a letter written about the year 1656. "The most considerable experiment I have made of late," he writes, "is this: I injected wine and ale into the mass of blood in a living dog, by a vein, in good quantities, till I made him extremely drunk." Under further infusions the dog died. But says Wren: "I am in further pursuit of the experiment, which I take to be of great concernment, and what will give great light to the theory and practice of Physick"; in the making of which prognostication he was fully justified.

The pen which he invented to write double, called the Diplographical Instrument, excited much attention, and the invention was pirated by some persons in London. Wren was not particularly touchy about such matters, but this one annoyed him so much that he wrote a letter to a friend asserting his rights; for, as he says, "tho' I care not for having a successor in invention, yet it behoves me to vindicate myself from the

aspersion of having a predecessor." The beginning of the letter is interesting from a reference it makes to Oliver Cromwell. He puts into the hands of his correspondent "that double-writing instrument, of the effect of which about three years ago, yourself, sir, as I remember, among other Ingeniosi, were Judges, at the same time when accidentally it was commanded to the view of the then great, now greatest person in the nation."

On one occasion Wren came into actual contact with this "greatest person." Some years before the Protector died, Wren had made the acquaintance of Mr. Claypole, who had married Cromwell's favourite daughter. At this time Wren's uncle, Matthew, was still enduring his long imprisonment in the Tower. Claypole was a great lover of mathematics and eagerly sought the society of the accomplished Wren, inviting him frequently to his house and table. One day when Wren was dining with the Claypoles, Cromwell came in, and according to his custom when with his family, he sat down without ceremony at the table. For some time he appears to have remained silent, and then fixing a keen and steadfast gaze upon young Wren, he suddenly said:

"Your uncle has been long confined in the Tower."

"He has so, Sir, but bears his affliction with great patience and resignation."

"He may come out, if he will."

"Will your Highness permit me to tell him this from your own mouth?"

"Yes, you may."

As soon as he could do so with propriety, Wren took his departure and joyfully hastened to the Tower, where he gave the Protector's message to his uncle.

But his ardour must have been sadly damped by the old Bishop's reply, for he said with much warmth that this was not the first time he had received the like intimation from that Miscreant, but he disdained the terms proposed for his freedom, which meant abject submission to his detestable tyranny, and that he was determined to tarry the Lord's leisure and owe his deliverance to Him only.

Wren must have been vastly disappointed with the abortive end of his mission, but he nowhere appears to have shared the old man's bitterness. Perhaps his philosophical pursuits induced within him a more equal mind than could be attained by the bishop, whose calling had led him into the thick of the strife, to his own long-drawn undoing.

There is no need to return to Wren's innumerable inventions; enough has been said to indicate the wide range of his speculations, which brought forth expressions of admiration and esteem from all the learned men of the time to whom opportunity came to mention him. Aubrey speaks of him as "a youth of prodigious inventive wit," Dr. Wilkins as "a prodigy of science," and Evelyn as "a rare and early prodigy of universal science." There is no need to burrow into long letters and Latin dissertations for further encomiums. All the learned world were of one opinion. It is not so surprising, therefore, as it otherwise would be, to learn that at the age of twenty-five he was chosen to succeed Laurence Rooke in the chair of Astronomy at Gresham College in London. His inaugural oration, delivered in Latin of uncommon elegance, was as modest as it was learned. Three years later he was appointed Savilian Professor at Oxford in succession to Dr. Seth Ward.

It is remarkable, throughout the records of his life,

how little the political upheavals of the time affected his doings or his steady pursuit of science; but one little glimpse of the disturbed state of society is afforded about this time in a letter from Bishop Sprat relating to Gresham College. It was in 1658, shortly after the death of Cromwell, and the soldiers had taken possession of the building as a garrison. Wren's cousin, Matthew, had gone to the College in order to ascertain whether any lectures were still being delivered, but was stopped by a man with a gun, who let him know that the purpose of the building was now changed. Its condition had also changed with its new occupants, for Bishop Sprat speaks of its nasty condition, so defiled, and the smells so infernal that even Dr. Goddard, who alone of Wren's colleagues still kept possession, would have been unable to remain "had he not before prepared his nose for camp perfumes, by his voyage into Scotland, and had he not such excellent restoratives in his cellar."

This state of things was not destined to last long, for with the Restoration of Charles II in 1660, much that had been upheaved settled back into its former condition. Wren, whose steady progress seems to have been but little affected by political events, took another and most important step some year or so after the return of Charles, for towards the close of 1661 he was sent for by the king to assist Sir John Denham, the Surveyor-General of his Majesty's works, who was in Evelyn's opinion a better poet than architect.

So far as is known Wren had not hitherto turned his attention to architecture in any practical way. His earliest building is the Pembroke College Chapel, Cambridge, not built until a year or two after his appointment under Denham. But he was quite equal to the occasion, and was soon engaged in the difficult task of endeavour-

ing to decide what measures ought to be taken to preserve Old St. Paul's. It is no part of the present purpose to enter into a description of Wren's architectural work, or of his progress in architectural design. Those subjects alone would require a paper many times the length of this. They can only be alluded to here in so far as they affect the story of his life; and the main current of his life was deeply affected by the connection with architecture which was now forced upon him. So deeply, indeed, that his fame as an architect has obscured, in the eye of the world, his fame as a man of science. Truly may we say he had greatness thrust upon him.

Having thus his energies diverted into a new channel, he proceeded to qualify himself for his new duties. We are not acquainted with all the steps that he took for this purpose, but one of the most notable was a journey to France in the year 1665, of which he gave an account in a letter to "a particular friend." He had introductions which smoothed his way and opened many jealous doors to him. He studied the principal buildings of Paris and the surrounding district, going as far afield as Fontainebleau. He evidently did a good deal of sketching. It would have been of the greatest interest to see these sketches, but, so far as I know, they have not been preserved. His French studies had some effect on his own design, but, taken as a whole, his work is characteristic of himself, and is thoroughly English in feeling—English, that is, of his own creation, for he had no great store of English precedents to guide him. There was another building in Paris which roused his enthusiasm, and that was the Louvre. His watching of the work there must have given his trained and receptive mind

an invaluable insight into the practical operations of building.

Not long after his return from France occurred the Great Fire of London, and he was appointed Deputy Surveyor-General and architect for rebuilding the whole City. What this meant for London, for architecture and for Wren's own fame is illustrated by St. Paul's Cathedral and the City churches. He became as wonderful an architect as he already was a man of science. Evelyn sums up his qualities in commenting on these very buildings—"a wonderful genius had this incomparable person."

After acting as deputy for some years Wren was appointed, in 1669, Surveyor to the Royal Buildings, a post which had been anxiously sought after by the learned and experienced Webb, and by Hugh May, who, according to Pepys, thought he had been badly treated in the matter by the Duke of Buckingham; for May had been his servant for twenty years, saving him from want of bread by his care and management. Yet now the duke had brought in Dr. Wren, "Which is an ill thing," adds Pepys, "though Dr. Wren is a worthy man."

Judged by their experience in architecture, either Webb or May was more fitted for the post than Wren, but that "worthy man" was outside the ordinary standards, and he more than justified his appointment. His services to science and art were officially recognised after an interval of some four years, when, in 1673, a knighthood was conferred upon him, and Dr. Wren became Sir Christopher. He was then forty-one years old, and he bore his title for fifty more.

Few have been the glimpses of his private life so far, and few are vouchsafed even up to the end. But

we know, although not from "Parentalia," that on December 7, 1669, he married, in the Temple Church, London,* Faith Coghill, daughter of Sir Thomas Coghill of Bletchingdon, where Wren's brother-in-law was rector, and it may have been that his sister Susan once more utilised her excogitancy in bringing about the match. Of his courtship but one incident is recorded; of his married life nothing at all, save the birth of two sons, one of whom died young, the other being Christopher, the collector of the material for "Parentalia." Where the married couple lived, whom they saw, how they employed their leisure, no one can tell us. That Wren was a passionate lover, or the victim of such romance as gives backbone to the modern novel, his whole bearing, his whole utterances go to deny. Rather was he the kind of sincere and affectionate suitor with whom Scott has made us familiar. The one incident of his courtship of which we know anything comes in the shape of a letter to Faith Coghill, written on June 14 in a year unrecorded. The young lady (she was, in fact, thirty-three years old) had dropped her watch in the sea—how or where we conjecture in vain. Her lover undertook to get it repaired and now returns it. "Madam" he begins, and "Your most affectionate and humble servant" he ends. In grave and measured language, illumined by a little playful fancy, he explains a delay in its return; he envies its felicity in being so near her side, he has "put such a Spell into it that every Beating of the Ballance will tell you 'tis the pulse of my Heart." He doubts whether it will be trustworthy in consequence of being "drenched in that briny bath." But as for me, he concludes, "(unlesse you drown me too

* Phillimore, p. 178.

Hampton Court Palace. From Pyne's "Royal Residences," 1819.

[illegible] "[illegible]," that [illegible] Temple Church, London,* Faith Coghill, daughter of Sir Thomas Coghill of Bletchingdon, where Wren's brother-[illegible] was rector, and it may have been that his sister [illegible] utilised her excogitancy in bringing about [illegible]. Of his courtship but one incident is re[illegible] [illegible] Christopher, the collector of the material for "[illegible]." Where the married couple lived, whom they saw, how they employed their leisure, no one can tell us. [illegible] Wren was a [illegible] lover, or the victim of [illegible] [illegible] his whole utterances go to deny. [illegible] was he the kind of sincere and affectionate [illegible] [illegible] of which we know anything [illegible] [illegible] [illegible] fact, [illegible] years old) had dropped h[illegible] [illegible] lover [illegible] to get it [illegible] and now [illegible] "Madam" he begins, and "Your most affect[illegible] humble servant" he ends. In grave and me[illegible] language [illegible] by a little playful fancy, he [illegible] a delay [illegible]; he envies its felicity [illegible] near [illegible], he has "put such a Spell [illegible] every [illegible] of the Ballance will tell you 'tis [illegible] [illegible] [illegible] in that [illegible] [illegible] he concludes, "[illegible] you dro[illegible]

* [illegible]

Whitehall March 7th (n.)

My Dear Son

I hope by this time you are pretty well satisfied of the condition of the climat you are in; if not, I believe you will ere long be over: & will learne to dine upon sallet, & Morue with Eggs will scarce be allowed: if you think you can dine better cheaper in Italy you may try, but I think the passing the Alpes & other dangers of disbanded armies & abominable lodging will balleace that advantage; but the seeing of fine buildings I perceive tempts you, & your companion Mr Strong whose inclination & interest leades him, by neither of which I can find you are moved; but how doth it concerne you? you would have it to say hereafter that you have seen Rome Naples & other fine places, a hundred others can say as much & more; calculate whither this be worth the expence & hazard as to any advantage at your returne: I sent you to France at a time of businesse, & when you might make your observations of the world, & find acquaintance who might thereafter be usefull to you in the future concernes of your life; if this be your ayme I willingly let you proceed, provided you will soon returne. for these reasons, the litle I have to leave you is unfortunately involved in trouble, & your presence would be a comfort to me, to assist me not only for my sake but your own, that you might understand your affairs before it shall please God to take me from you, which if suddainly will leave you in perplexity & losse. I doe not say all this out of parsimony for what you spend will be out of what will in short time be your owne. but I would have you be a man of businesse as early as you can bring your thoughtes to it. I hope by your next you will give me account of the Reception of our Ambassadors at the Intrigues at this time between the two Nations, of the establishment of the Empress, & of any thing that may be innocently talked of without danger & reflection, that I may perceive whither you looke about you or not, & penetrate into what occurres, or whither the world passe like a pleasant dream, or the amusement of fine scenes in a play without considering the plot. If you have in ten weekes spent halfe your Bill of exchange besids your Gold, I confesse your mony will not hold out either abroad for your selfe, or for us at home, to supply you, especially if you goe for Italy, which voyage forward & backward will take up more then twenty weekes: thinke well of it, & let me hear more from you, for though I would advise you, I will not discourage you. Mr Strong hath proffered credit by the same merchant he uses for his Son, and I will thinke of it: but before I change you must make up your account with your Merchant & send it me. My hearty service to young Mr Strong & tell him I am obliged to him for your sake: I blesse God for your health and pray for the continuance of it through all adventures till it please him to restore you to me & your Sister & freinds who wish the same as doth

Your most affectionate father

Chr: Wren

Poor Billy continues in his indisposition, and I fear is lost to me, and the world to my great discomfort and your future trouble

Facsimiled Letter reduced (dated March 7th, but with no year) from Sir Christopher Wren to his Son abroad. (From the R.I.B.A. Collection. Heirloom Copy of "Parentalia.")

in my teares) you may be confident that I shall never cease to be, your most affectionate, humble servant." The letter is preserved in the Institute's copy of "Parentalia," but as far as the book itself is concerned, Faith Coghill, the mother of its compiler, might never have existed.

Rather less than six years after her marriage Lady Wren died, her absence being as little noted as her presence. After a lapse of eighteen months Wren married again, in February 1677. His second wife was Jane, daughter of the second Lord FitzWilliam, Baron Lifford, in Ireland, a member of the well-known English family of FitzWilliam. She lived but two years and a half and then died, leaving a daughter Jane and a delicate baby William. Wren was again a widower, and with the care of three small children. Of their nurture we know, once more, nothing. They all grew up: Christopher to become a traveller in his youth, with the free hand of an ingenuous, well-to-do young man; later to marry, to become a member of Parliament and to compile the records of his family. Jane lived to the age of twenty-six, and then died unmarried. Judging from her epitaph, she must have been a congenial companion to her father; just such a daughter as we might expect him to have; given to letters, pious, benevolent, and—what her father never pretended to be—most skilled in music. Wren must have missed her sadly, but with so full a public life as his, there was little time for private sorrow. The youngest boy, Billy, to whom Evelyn stood godfather, was a delicate lad whose health caused some anxiety to his father. Indeed he mentions him in a letter to his elder brother as being within sight of death, but the alarm passed away and William lived to be fifty-nine, though how he

St. Mildred's Church, Bread Street. From Birch's "London Churches of the 17th & 18th Centuries." (Reproduced by the courtesy of Messrs. B. T. Batsford, Ltd.)

employed his time is as much unknown as the other domestic details of the family. Beyond the love-letter to his first wife there are preserved but two letters of Wren (in English) which have merely a private interest. They are both written to his son Christopher on occasions when he was abroad, in a strain of fatherly affection and advice. The only intimate touches consist, in the one, of a wish that the traveller may soon be restored to his sister and friends, and, in the other, of the statement that "wee are all in good health in both Houses, and wish you happinesse wch wee also contrive for you" —expressions which may have been prompted by the impending marriage of the absent son.

The second letter was written in 1705, when Wren had still many years of active life before him. Although he was fully engaged in his great works of architecture, he still found time to submit scientific discoveries and theses to the Royal Society, of which he became President. Not only did he follow lines of activity which had long been familiar to him, but he entered political life and became a member of Parliament. Whether he ever did anything more than vote, whether he was even exemplary in the discharge of that duty, is left to conjecture. But one thing is evident—that he was not a violent partisan. It is impossible to imagine him absorbed in politics when his life was so full of nobler interests.

That life had been, so far, one continuous *crescendo* of achievement, but now he was to experience, in his old age, the only reverse he sustained, a reverse not unconnected with politics, and, it may be, partly brought about by the fact that, being a member of Parliament, he must have been, nominally at any rate, a party man. Largely, it is said, owing to Court intrigues, he was

dismissed at the age of eighty-six from the post of Surveyor-General, which he had held for forty-nine years, in favour of a man of no capacity and of doubtful integrity.

He endured the reverse with dignity, secure in the esteem and sympathy of all great minds. He retired to his house at Hampton Court with the terse observation (in Latin), "Now fortune bids me play the philosopher more readily." In this frame of mind he continued till his death in February 1723, revisiting occasionally the scene of his great triumphs, and being taken once a year to spend some time beneath the Dome of St. Paul's.

Of Wren's personal appearance we can form a judgment from Kneller's portrait, always making allowance for the great wig with which the fashion of the times endowed him. We learn from another source, however, that in stature he was small. For it is related that when Charles II visited a house which Wren had built for him at Newmarket, he complained that the rooms were low. When Wren, walking about and looking up, ventured to think they were high enough, the king stooped to the height of the architect, and, strutting about in this constrained attitude, looked up likewise and said, "Upon second thoughts, Sir Christopher, I think so too."

In character he was singularly great—tranquil, grave, dignified. His letters proclaim him as such, nor is there any record of outbursts of spleen or undue vexation. A disposition so richly endowed as his could not have been devoid of humour, although there is but little exhibition of it in his writings. The grave playfulness of his love-letter to Faith Coghill, and the erudite punning of his Latin inscription on a pomegranate sent

to a friend in his youth, are perhaps the chief evidences of his possession of this wholesome salt of the mind. His mind was active enough, but not sufficiently nimble to render him witty. One of Bishop Sprat's letters to him is occupied with a definition of wit, "this generous eagle-wit," as he calls it; and towards the close he says—almost as though to solace his friend for its absence —"The truth is, it is seldom to be found among men of large and full and high thoughts." And such a man Wren was. His equable temper is manifested in his attitude towards the strife amid which his earlier years were passed—a strife infused with the potent ingredients of religion and politics, a strife which sundered families and drove even estimable men into the bitterest invectives. Although the atmosphere in which Wren was brought up was intensely Royalist and high-church, it led him neither into fanaticism on the one hand, nor into the reaction of indifference on the other. He was singularly free from the extravagance, dogmatic assertion and provocation which marred the utterances of many sincere men of that age. His letters do little to reveal this side of his character, but that his disposition was pious is shown, not only by those addressed to his father, which are instinct with filial love and veneration, but by the edict against swearing which he issued to the workmen engaged on St. Paul's. Such impiety, he says, was to be utterly banished from those works, intended for the service of God and the honour of religion.

Although brought up in high-church surroundings he was never embroiled in polemical controversy. He recognised in the most practical way that the nation was Protestant in its faith, for in a letter on the building of churches he insists, among other things, that they

must now be planned for a Protestant form of worship, and so that the whole congregation should be able to see and hear. Indeed one of the most noteworthy points about his City churches is that they were designed to conform to a new order of things for which there were few, if any, precedents to be found in England.

In the domain of politics he was equally moderate. Royalist though he was by training and early associations, he nowhere inveighs against or even rails at the Puritan party. To him the king's head is no more " sacred " than is Cromwell a "Miscreant." The violent animosities which those terms connote were unfelt by him, or at any rate unexpressed. Inigo Jones and Ben Jonson, great artists in their several ways, quarrelled bitterly, to the great vexation of their souls. Wren fell out with no man, but pursued his serene path on a lofty plane, absorbed in the problems of philosophy and art, leaving far beneath him those wild passions which destroy kings but leave the eternal verities untouched.

The Church of St. Dunstan's on Hill, from Billingsgate. E. W. Cooke, del.; George Cooke, sculp. 1828.

SIR CHRISTOPHER WREN'S PARISH CHURCHES. *By Arthur Keen, F.R.I.B.A.*

TWO things have to be borne in mind in looking at Wren's London churches; first, as affecting their exteriors, that the height of the adjacent buildings is double that of the buildings originally surrounding them, and second, in relation to the interiors, that hardly any excepting St. Mildred's, Bread Street, is even approximately in the condition in which Wren left it; the proportions have been altered by the removal of the pews, the flagged floors have been changed for coloured tiling, the windows in many cases have been altered; decorators have destroyed all breadth of treatment by introducing as many different colours as they could find room for; and the old white glazing has given place to stained glass of the crudest kind. It is an unfortunate thing that a classic church is always at the mercy of the decorator, and no better illustration of this could be found than the aspect of the dome of St. Swithin's at the present time as compared with its appearance a few years ago. Then it was one of the most beautiful things in the City, a greyish-blue dome very fully relieved with gold; to-day it is merely commonplace.

Nothing distinguished Wren more than his versatility, the fertility of his mind, and nowhere can the illustration of it be found better than in his London

churches. He built about fifty of them, and in them it almost seems as if he were exploring all the possibilities of interchange among the accepted features and methods of design. It is obvious that in the use of columns, entablatures, arches, vaults, domes, groined vaults and flat ceilings there is no limit to possible variety, but it is very remarkable to find in one man's work such resource and imagination as Wren exhibits in this matter. In many cases the plans of the buildings approximate to each other,—small, roughly square buildings where much subdivision was not possible, but in every instance the interior design was distinctive. The two destroyed churches of St. Benet Fink and St. Antholin's show it very well; both had columns arranged on an elliptical line; both had domes more or less of dish-cover form, but in the former case there were barrel vaults between the columns and the outer walls, forming an arcade around the ellipse, and the dome, which was carried on pendentives, had a small central lantern; while at St. Antholin's the columns carried a continuous entablature, and the dome, which was of higher pitch than at St. Benet's, was lighted by bull's-eye windows. Both of these interiors must have been among the most graceful and interesting of Wren's smaller works, and in both the effect of the lighting must have been particularly good. The same thing applies in the case of the square churches having an inner square formed of four columns; one, St. Mary-at-Hill, has a central dome carried on pendentives between four arches forming the ends of barrel vaults; one, St. George's, Botolph Lane, had a central vault from end to end with flat ceilings on both sides constituting the orthodox arrangement of a nave and side aisles; St. Anne and St. Agnes has thin

columns carrying an architrave and cornice without the usual frieze, and four low and very wide vaults intersecting over the central square, leaving the corners covered by flat ceilings. St. Martin's, Ludgate Hill, has, in words, a similar treatment, but in fact an entirely different appearance; the columns are big, the proportion is high, the vaults narrow, the entablature complete and very elaborately detailed. The general effect is that of a cross, while at St. Anne's the impression is that of a big square covered by a groined vault. At St. Martin's the impression of height is increased by three openings on the south side of the church arched over with deeply recessed coffered arches, and looking into the tower and the lobbies on either side of it—a very fine feature in the design of the church.

As regards the exterior of the churches, except in the case of the steeples, there is nothing like the variety that is presented in the interiors. Wren made little use of columns or pilasters outside his buildings; the walls are continuous masonry; not divided much into piers and panels or columns and fillings; the plinth, cornice or pediment, parapet or balustrade and the windows, together with the rustications at the angles, constitute the major portion of the relief; but the steeples are designed with such care, such variety and such beauty that they have become a by-word in connection with London. They are invariably on an outer wall so as to be seen from the ground upwards, the towers are generally well defined and quite simply treated, but the spires or lantern tops are the subject of most skilful and elaborately beautiful design. There is this important difference structurally between many of Wren's steeples and those of the mediæval time; the Gothic builders used arches or corbels across the angles of

their square towers to effect the transition to the octagonal plan of the spire above, but this was as far as they could go; generally the placing of any heavy weight over the centre of the tower was beyond them. Wren brought both the dome and the cone into service, and with their help constructed spires like that of St. Mary-le-Bow church, for example, in which the central load built over the void of the tower is enormous. In effect the Gothic spire is a stone roof springing off the walls of the tower; Wren's spire is a stone construction of almost any form standing over the middle of the tower. In Bow steeple and at St. Bride's there is actually a circular staircase shaft of stone up the middle of the spire. It is obvious that an upright semi-elliptical dome of some little height in comparison to its diameter is a very strong construction, and it was to such a construction and to cones like the great cone carrying the stone lantern of St. Paul's dome that Wren committed himself with well-founded confidence. With their help his wonderful lantern spires, varying in plan at every stage, became possible, and he availed himself of the possibility with endless invention. At the same time he used timber construction with equal success, and in the case of St. Margaret Pattens he produced a timber spire on the orthodox Gothic pattern that is of very beautiful proportion. St. Mary-le-Bow steeple may well be claimed as the most beautiful thing of its kind ever built. It stands at the corner of the church with great arched openings on the two exposed sides that are as fine pieces of classic detail as any in this country; the divisions of the tower are faultless in proportion, and the outline of the whole construction from pavement to vane is altogether wonderful and certainly

St. Bride's Church, Fleet Street. From Birch's "London Churches of the 17th & 18th Centuries." (Reproduced by the courtesy of Messrs. B. T. Batsford, Ltd.)

one of the finest items in a street view to be seen anywhere.

Of his other great steeples St. Bride's and St. Magnus the Martyr are probably the finest. In St. Magnus a tall octagonal story stands above the square tower, and a domed lead roof of great beauty crowns the whole. The tower stands at the north end of London Bridge, where it is seen to full advantage in bright sunlight. It is an extremely well-proportioned structure and the skyline of it remarkably fine. In this building as in others Wren made very effective use of a well-designed bracket clock projecting boldly from the wall of the tower. Other instances are St. James's, Garlick Hythe, and St. Mary-le-Bow.

Among the most graceful as well as most original of his designs are the well-known "lantern" towers; St. Michael's, Paternoster Royal, near Cannon Street, St. Stephen's, Walbrook, and St. James's, Garlick Hythe, are very beautiful ones. The lanterns stand well back from the walls of the tower, and the complexity of the design of them is contrasted in an effective manner with the simplicity of the towers. The balustrade or parapet of the tower in each case is treated with a good deal of detail, and vases at the angles are made use of in order to help the outline against the sky, but the towers themselves are made severely simple. The lanterns are set back in successive stages with great variety of outline. Whether seen at a distance or in steep perspective the composition of them is perfect, and they possess the great merit of looking sound and substantial constructions in spite of their wealth of detail.

It is well worth noting that Wren made very good use of lead in his buildings. The dome of St. Paul's

is a striking instance, and there are very many cases in which he finished the towers of his City churches with lead tops of great beauty and extraordinary variety of form. The great brick tower of St. Peter, Cornhill, has a finely proportioned lead dome of circular form on which stands a tall lead spire above an intermediate story in which openings occur.

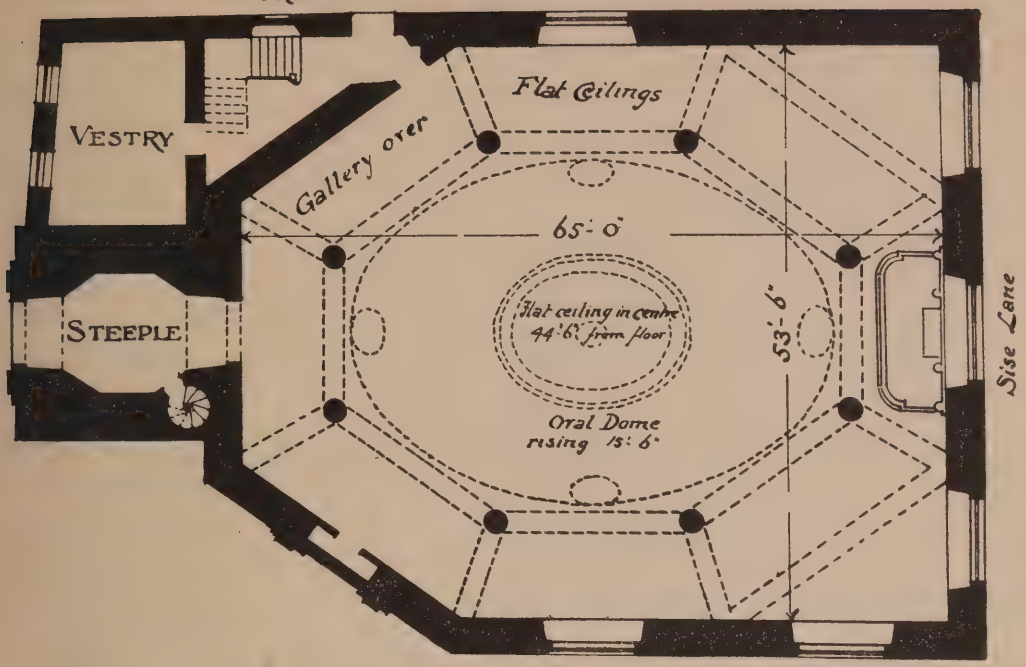
A lead dome of more or less similar type but without the spire finishes the brick tower of the charming church of St. Benet, Paul's Wharf, a building in which red brick and Portland stone, together with a great wood eaves cornice, a tile roof and carved brick festoons, are combined with fine feeling for picturesque effect of the broad and simple type. The proportions of the tower of this church, with its angles of stone and brick in alternate courses and its beautiful domed lead top, are very good. One of the most successful of the lead spires is that of St. Edmund in Lombard Street, a kind of lead lantern carrying a curved lead spire with openings in it. The whole is big in scale and proportion, and the treatment of the detail strong and bold. There were about twenty of the lead-topped towers, many of them very admirably designed and all sound and dignified in form and outline. St. Edmund's church stands in a narrow street, but the tower is opposite to a small cross street. This is a feature in street planning that Wren made considerable use of in his plan for rebuilding London after the Fire, and the example of St. Edmund's is a very convincing one. The beautiful tower would have been almost valueless without the street facing it, but standing as it does it is one of the most striking things in the City. In this case, again, there are vases on the angles of the tower to help the transition from the

The Church of St. Benet-Fink in Threadneedle Street, taken down to make way for the New Royal Exchange, 1844. G. Shepherd, del.; J. Wedgwood, sculp. 1811.

St. Mary Magdalen Church on the North side of Knightrider Street. George Shepherd, del.; J. Skelton, sculp. 1812.

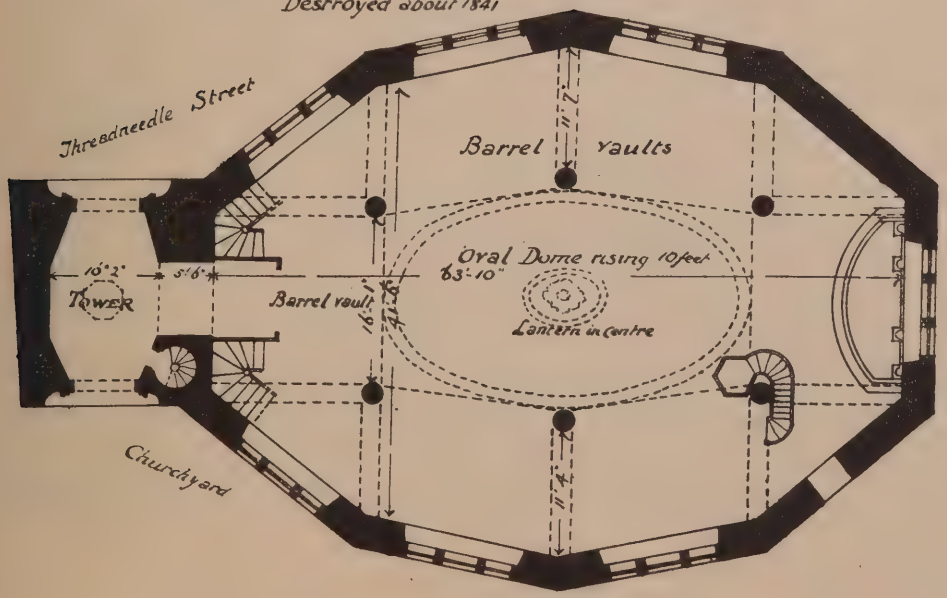
St. Antholin Budge Row :

From Clayton



St. Benet Fink From Clayton

Destroyed about 1841



square of the tower to the octagon above it. Another fine lead spire, not as well outlined as that of St. Edmund's, but an extremely interesting one, is that of St. Augustine's, Watling Street, just to the east of St. Paul's, and another is the very well-known one of St. Martin, Ludgate Hill.

The works of Wren's successors in all parts of the country have made us so familiar with the type of steeple introduced by him that the originality of his conceptions loses some of its appeal. They are so sane and reasonable in design, so fine in outline, so various in form and type, and so beautiful that there is nothing in the history of architecture, the work of one man, that is comparable with them; nothing that shows such freedom of invention, such judgment of proportion, such grasp of the essential factors in successful design, and when they are thought of in comparison with buildings like Chelsea Hospital, Hampton Court or the Blue Coat School in Newgate Street, now destroyed, one can only feel again that there was practically no limit to the fertility of Wren's mind.

While many of the City churches are quite small there are some that are very large buildings: Christ Church, Newgate Street, for instance, and St. Peter's, Cornhill; most of these have galleries, none of them has a chancel; in most cases the organs are at the west end, and all of them were built for preaching and for congregational worship rather than for ritual. The gallery was a very important factor in the design, and in nearly all cases, save at St. Bride's, it imposes a strong horizontal division in the general design of the interior. At St. Bride's there are coupled columns against which the strong line of the galleries is stopped in each bay; treatment that has often been adversely

St. James's Church, Garlick Hithe.
J. Coney, del. et sculp. 1812.

criticised; but the church is so beautiful and so finely disposed that the defect, such as it is, may be overlooked. The gallery front is very well designed—each bay complete in itself—and there is a projecting pier at each column to support it. The ceiling of the church is a splendidly designed vault with strongly marked ribs and panels neutralising the feeling of weakness that might arise from the wide cross vaults over the bull's-eye windows cutting into the main vault. On the whole the interior is one of great dignity and very fine proportion.

Generally where galleries occur the lower story has piers panelled in oak, and the columns start at the gallery level. A very interesting development occurs in the big church of St. Andrew, Wardrobe, where there are square, panelled pillars in two stories, carrying first the gallery and then the groined vaults of the aisles which run out into the barrel vault over the nave. The interior of this church is not as well proportioned as some: the width in relation to the length is very great, and there are defects in the design of the plaster work of the main vault; but it is very striking and interesting. In the case of a wide main vault of full semicircular curve with narrow openings into the aisles and cross vaults running into the nave vault, as in this instance, the effect of the cross vaults is that of a nave arcade. This church was built in 1692, after Wren had gained a good deal of experience in the design of interiors, and it possesses a good many points of interest.

One very important feature in most of these churches is the western organ. It is generally of great size and treated with very beautiful and complex detail; richly carved and panelled; the pipes arranged in semicircular turrets surmounted by bold cornices of great

projection, and in some cases carrying carved figures. The gallery, the screens, the churchwardens' pews and the organ itself are commonly treated as a whole, and they are among the finest examples of the joiner's art in the country.

Another thing that contributes very much to the character of Wren's interiors is the modelled plaster work that he used very freely. Generally it does not possess much intrinsic beauty, but it is so exactly right in scale and is handled with such boldness and freedom that it gives extraordinary texture and value. It is used in rich bands at the base of domes, in elaborate corbels and brackets, in surface decoration on panels, in relief to vaulting ribs, in ornamental lines and circles on vaults and domes and in festoons about circular windows; always with very fine feeling for proportion and often with extreme richness. St. Mildred's, Bread Street, is a very good example of the way in which Wren handled his plaster work and, at the same time, of his attitude towards problems of design generally. The plan of this church is a simple oblong without either recesses or projections, sixty feet long and thirty-eight feet wide. He has arranged the interior with a central dome the full width of the church, carried on bold pendentives between four semi-circular arches. The arches on the north and south are simply wall ribs, but those on the east and west are vaults occupying all the space left by the dome—about twelve feet in each case. These arches spring from well-designed scroll corbels, and to carry the wide arches, really vaults, at the east and west ends there are arches from corbel to corbel filled in with modelled plaster work. The sense of completeness and adequacy in this design in spite of its small size, and in spite of the simplicity

Church of St. Edmund the King.
From a Drawing by G. Shepherd,
1811.

Church of St. Edmund the King.
From a Drawing by G. Shepherd.
1911.

of the plan, is remarkable, and the church, as pointed out earlier, is happy in having been altered less than any of the City churches since it was built. There is very good woodwork in it and some beautiful metal work and tablets. It is not only the organs of these City churches that show very fine joinery work; the reredoses and pulpits, the latter especially, are most interesting examples of rich and original detail. Very few of them have not something remarkable to show, and the woodwork at St. Mary-at-Hill, St. Lawrence's, St. Nicholas, Cole Abbey, and St. Margaret's, Lothbury, is remarkably fine. The wrought-iron sword-rests are well known, and many of the churches have exquisitely designed marble fonts.

It is not possible in a short article to deal with all the churches or even all the types, but many of the smaller ones which have one aisle or only a recess of two or three bays are very interesting in design. The Church of St. Vedast, for instance, in Foster Lane, has an aisle separated from the nave by four low arches on Tuscan columns, giving dark masses of shadow in a well-lighted interior that is roofed over by a flat ceiling surrounded by a cove into which are cut the arches over the windows. A similar plan occurs at St. Margaret Pattens, but here the aisle has a gallery in it. A church that forms a striking contrast to most of the others as regards the interior is that of St. Nicholas, Cole Abbey. It is a plain oblong hall with a flat ceiling relieved by wide flat beams carried on flat pilasters, but the entrance at the west end is under an organ gallery very richly detailed in three bays. It is not a very beautiful interior, but is interesting as showing the wide scope that marked Wren's handling of problems in many respects similar to each

other. In some cases he handled oblong sites in a very ingenious fashion in order to secure a square over which to build a dome, and his domes are of many kinds: an octagonal one at St. Swithin's, a circular one on eight pendentives over a square at St. Mary Abchurch, the whole width of the church; a circular one on pendentives over four inner columns at St. Mary-at-Hill. In this last case there are four barrel vaults running back from the columns, leaving flat ceilings in the angles and forming arches between the pendentives. At St. Stephen's, Walbrook, Wren seems to have started his design from a preliminary octagon formed of columns carrying the circular dome. From four sides of the octagon barrel vaults run out to form the nave, choir and transepts, and from the other sides are carried aisles that have flat ceilings over them. The extreme richness of the interior of this church depends in great measure on the fact that the whole superstructure is carried on columns set at some little distance from the walls. It is in effect a five-aisled church, and while there are faults to be found in the design, the total effect is one of great intricacy and beauty.

Perhaps the greatest fault that Wren was guilty of in his interiors was in not carrying entablatures all round the building. There are many cases where they stop at the walls, generally because if carried on they would be in the way of windows. This is a source of weakness in the general effect, and a far better result could have been secured if the architect had resolutely adopted some other method of handling his windows. In some cases, too, for instance at St. James's, Garlick Hythe, the lighting is so uniform that there is very little balance or contrast of light and shade. The marvel is,

St Antholin's Watling Street
Destroyed 1875
From Clayton's Book · Published 1848
26·4'
29·4'
44·6"
Scale of Feet
0
10
20
30
40
50
60
70
80 Feet

however, that a single man dealing with so many buildings in the City of London concurrently with great works that were going on in other places—Greenwich, Chelsea, Hampton Court, Oxford and Cambridge and elsewhere—could create works of such diverse types and on the whole of such real interest and beauty. In each case the main principle of the design is carried out very consistently, and it is generally a very dignified one. Nothing could be more dignified than the severe simplicity of the interior of St. Magnus' Church. Two rows of big columns carry an unbroken entablature, above which springs a barrel vault running from end to end of the church—noble in proportion and sound in detail.

These churches are so accessible that they need not be described in further detail; they stand within a few minutes' walk of each other, and they are commonly open on week-days. Unhappily they stand on land that has a very high value, and therefore they are always in danger. The best means to secure their safety is to bring about, first, due appreciation of the value of external beauty in cities, and, secondly, such appreciation of the particular value that old churches have in the City of London or in any other city. It is not alone a question of their intrinsic beauty as works of art, nor of their value as records of the past history of the nation and as memorials of Christian worship, carried on for many centuries past where they stand; but of their value as points of relief and interest in the monotony that belongs to the streets of a commercial city—even of a city that is architecturally a fine one. Very many of them have been sacrificed, and we can spare no more.

THE DESIGN OF ST. PAUL'S CATHEDRAL.

By Beresford Pite, Hon. M.A. (Cantab.), F.R.I.B.A., Professor of Architecture at the Royal College of Arts, South Kensington.

AMID the centuries of history our cathedrals remain the greatest and most characteristic buildings in the land. Neither the castles of the Middle Ages, the houses of the Renaissance, nor the Governmental or Commercial buildings of modern times attain the dominating height or liberal extent of these great churches, and every cathedral necessarily witnesses to the highest purpose and the most profound sentiment.

Great buildings grow in stature slowly; cathedrals cannot be hastily created. Durham, Lincoln and Canterbury were crowned with lanterns hundreds of years after the extent of their main structures was determined, erected and consecrated. The cost was not only slowly counted and collected, but the conception of completeness developed and blossomed with progressive beauty as the centuries passed. The simpler early idea of the crowning feature elaborated itself with a force that consistently left the original intention far behind. The mediæval church builders, unlike their modern disciples, never looked backwards. The fabrics of all our cathedrals, excepting St. Paul's of the Restora-

tion, bear witness to the historic growth of English architecture. They are each the work of several generations, and as they stand to-day are the accumulations of progressive building art.

Such considerations show a remarkable contrast with the conditions under which St. Paul's was built. This Cathedral was completed in the single lifetime of Christopher Wren, its master builder. Though the record of its erection seems dreary and public opinion was both impatient and insulting, progress with the immense undertaking was marvellously rapid. The greatest of the English cathedrals was finished more swiftly than the smallest. It is to the character of the builders that we must look for an explanation of this achievement. The era of the erection has often been misjudged as lacking in moral earnestness, but in so far as the building of an English cathedral reflects the energy and capacity for execution of the age which produced it, the generation of Sir Christopher Wren and of his workmen must be honourably acquitted.

England was suffering from a long period of religious and political disorganisation. It had scarcely emerged from the distress and impoverishment of Civil War. The social atmosphere, when reviewed, showed no freedom from pettiness and controversy, and parsimony marred the fulfilment of schemes undertaken in the enthusiasm of the Restoration, and missed the opportunities of reconstruction. After the Fire of London a sad catalogue can be made of failures to take advantage of these circumstances, both in the treatment of the thoroughfares and spaces around the Cathedral, and of its internal decorations. The exertion involved in so great an undertaking could not but suffer from all such defects in the machinery of the times.

St. Paul's Cathedral. From a Pen Drawing by Professor Beresford Pite.

It may be interesting to extend our review beyond England for a moment to the vaster Christian Temple of the Divine Wisdom, erected at Constantinople, adjoining that of the pagan Minerva. It offers the only possible parallel to St. Paul's in completeness and rapidity of execution, although the transepts designed by its architect, Anthemius, have never been built.

The Emperor Justinian, forty days after the fire that destroyed the ancient church, undertook the re-erection; ten thousand workmen were employed, paid daily in fine silver, and encouraged by the Emperor's presence, in suitable habit, with the miraculous result that the new building was consecrated at Christmas, 537; five years, eleven months and ten days from the first foundation. Twenty years later, the dome had to be rebuilt and re-dedicated, but the practical completion then attained remains to-day. This great building shares to some extent with St. Paul's the singular merit of unity of design and construction, but a reckless profusion of oriental wealth and labour must be set against the corresponding difficulties in the problem of the English architect.

Since the breach with the Papacy, England throughout the political storms of Elizabeth's long reign had been isolated from intimacy with Italy, France and Spain. Intercourse with the stream of European culture had only flowed through the channels of the Protestant Netherlands. The remarkable national developments of the Elizabethan age were exhibited in adventure upon the seas, and in the New World, and in the genius of Shakespeare and Bacon; but in any survey of progress in artistic culture, England in that reign occupied but a negligible position.

The policy of James I was one of *rapprochement*

View of St. Paul's Cathedral across the Dome from the South Aisle of Nave. From a Pencil Drawing by C. E. Mallows. (R.I.B.A. Collection.)

with the Catholic courts of Europe. The negotiation of the unpopular and futile Spanish marriage and the eventual betrothal and wedding of Prince Charles to Henrietta Maria of France re-opened the flow of Renaissance fashion and taste into England.

To understand the problem, Old St. Paul's must be taken into account. The mediæval Cathedral of London was of immense extent, its length of 600 feet exceeded that of Westminster Abbey, including Henry VII's Chapel, by 100 feet. The nave was 320 feet long to the centre of the crossing, exceeding Winchester by 20 feet. Westminster and Ely have 250 feet, Durham 225 feet, and new St. Paul's 240 feet. The old central spire, of wood and lead, was the highest in Europe; the tower was 240 feet high; Wren estimated the total height at 460 feet, 50 feet more than the Salisbury spire.

A characteristic portico had been added to the old cathedral by Inigo Jones. It consisted of fourteen Corinthian columns, seven bays in width and two in depth, with two pilaster piers; it was 120 feet long and 66 feet in height. This was a really beautiful and scholarly work, the first accomplished example of architecture in England since the decay of mediæval art; in Wren's phrase: "an absolute piece in itself." The designer of the Banqueting House of Whitehall understood and practised the art of his classical master, Palladio, and in the portico bestowed upon St. Paul's something more than a mask of Italian pastry.

The artistic character and sympathy of Charles I are shown not only by his importation of Italian masterpieces of painting, for the purchase of which Inigo Jones, in his character of King's Messenger, had been employed in his Continental journeys; but also by his bearing the whole cost of the erection of the Cathedral portico.

The beauty and popularity of this design really endure until to-day, for the existing lower portico of St. Paul's employs the same Corinthian order and proportion as its predecessor, though the columns are in pairs instead of being spaced singly.

The Restoration of Charles II in 1660 involved the restoration of the Church and of its principal cathedral, and upon the scene soon appears the Savilian Professor of Astronomy at the University of Oxford, Dr. Christopher Wren, together with a travelled and cultured gentleman, Mr. John Evelyn. The latter had met the former on July 11, 1654, and had then noted him down as nephew to the Bishop of Ely. It was ten years later, in 1665, that they met as Commissioners, in order to report on the defects in the old Cathedral and to prescribe for their repair. Evelyn was then forty-five and Wren thirty-three; and with them was Sir John Denham, poet, and King's Surveyor-General.

As the plague of 1665 had suspended all meetings and other operations, Wren wintered in Paris. He had intended to visit Italy; but neither on this occasion nor subsequently was he able to carry out what must have been an unusually urgent wish. Evelyn's conversation, as well as his knowledge of the sources of Inigo Jones' inspiration, would have contributed powerfully to his desire to visit the goal of all artistic minds. The months that he spent in Paris, however, exercised his mind sufficiently; his eyes were wide open to the architectural wonders then being undertaken by the school of great architects, produced by the patronage of the Grand Monarch. His indefatigable observation and inquiries sowed seed that soon fructified in the unprecedented opportunity that presented itself shortly after his return

Drawing by C. R. Cockerell, R.A. (engraved by Wm. Richardson), of Sir Christopher Wren's Principal Buildings in London and elsewhere.

to London to advise with the Commissioners in August 1666.

Wren evidently had been consulted with Evelyn, in the earlier days of the Commission appointed at the Restoration; for the latter, in the dedication of his "Account of Architecture," published in 1664, says: "You will not, I am sure, forget the struggle we had with some, who were for patching it up anyhow (so the steeple might stand) instead of New Building, which it altogether needed." His visit to Paris terminates with a full report laid before the Commission, about May 1, 1666, after three years of apparently fruitless expense of £3,600.

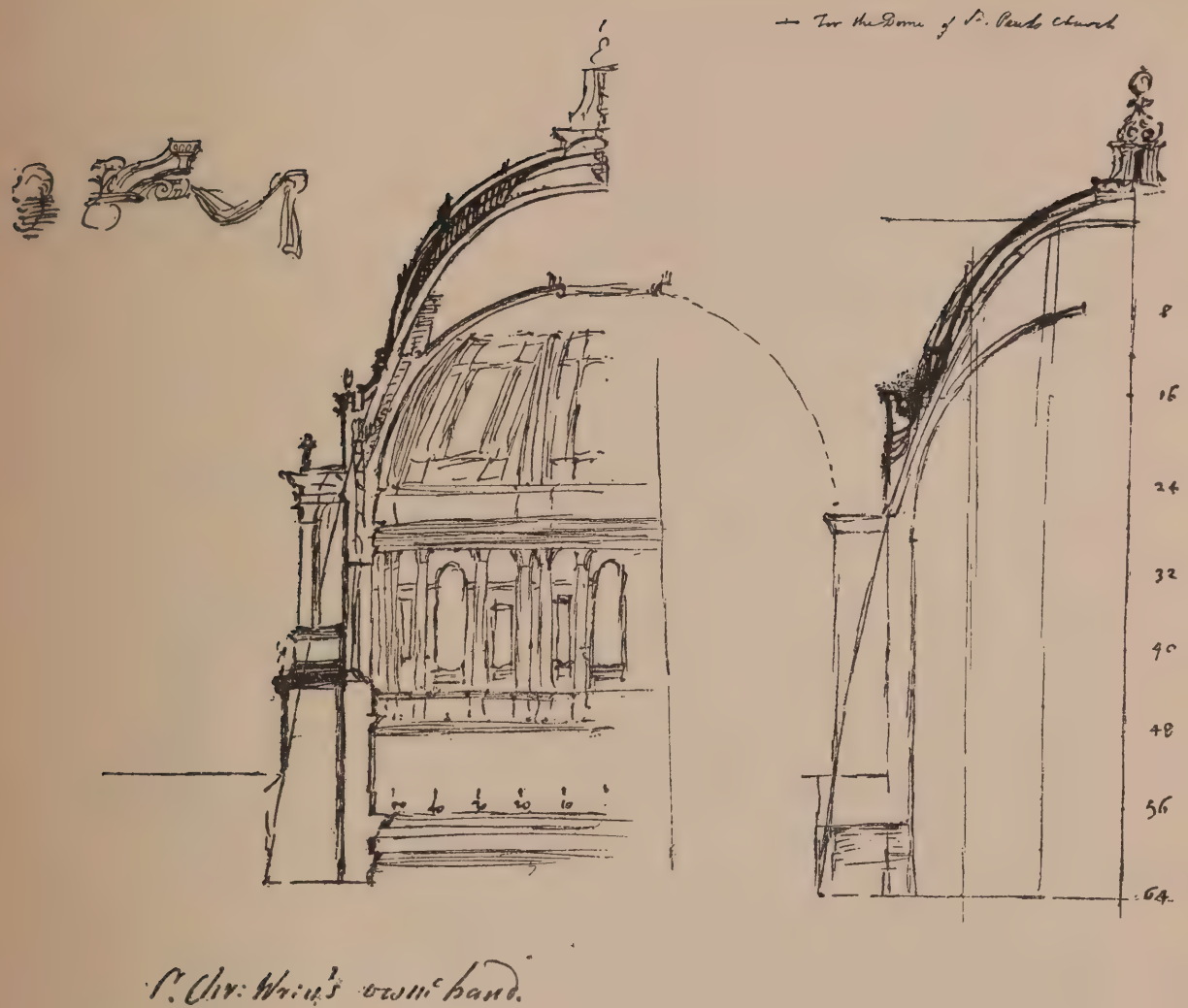
He considers the requirements of a Protestant Cathedral, an argument that needed re-stating. "The cathedral is a pile for ornament and for use. It demands a choir, consistory, chapter-house, library, preaching auditory, which might be furnished at less expense but would want grandeur. It was a monument of power and mighty zeal in our ancestors in public works, in those times when the city had neither a fifth part of the wealth it now boasts of."

The defects of the building are then examined: the weight of the roof had not sufficient abutment; the pillars, eleven feet in diameter, grown to this by accretion, ill-built and cased, were six inches out of the perpendicular, their core was of small stones, the case of ashlar masonry was mouldered and flawed away with the saltpetre that was in them, "an incurable disease, which perpetually throws off whatever coat of plaster is laid on it, and, therefore, not to be palliated." He recommends that as the outside of the church had been coated by Inigo Jones, "so should be the inside, after a good Roman manner, as easy to perform as to follow the

Gothic rudeness of design." The roof should be a thinner shell of stone " very geometrically proportioned to the strength of the butments. The roof might be of brick with a certain stucco, which to this day remains firm in many ancient Roman buildings." He proceeds to attack the existence of the huge piers under the central tower, an evident bugbear on the removal of which he had set his heart. This is an epoch-making conception in the Cathedral's history.

That which had happened three centuries previously, at his uncle's cathedral of Ely, is in his mind's eye. There the central tower fell, bringing down with it the adjoining bays of nave, transepts, and choir, and was replaced by Alan de Walsingham's inspired Octagon. He proposes to cut off the corners of the crossing, creating a " rotundo " with a cupola or hemispherical roof, and over it a lantern to rise perpendicularly, though not to such a needless height as the old wooden spire. We reflect also that Wren had met Bernini, the great Italian architect, in Paris, and that the beautiful domes then in course of erection in that city provoked his emulation on behalf of St. Paul's.

He says, that thus a proper space for a large auditory will be provided, and " the outward appearance of the church will seem to swell in the middle by degrees from a large base, rising with a rotundo bearing a cupola, and then ending in a lantern ; and this with incomparable more grace in the remoter aspect than it is possible for the lean shaft of a steeple to afford." Plans followed ; the design of the cupola based upon the then existing plans was prepared, and apparently with a model was laid before a meeting of the Commission on August 27, 1666. Evelyn recounts that on the 25th he went " to my Lord Chancellor, who had, with the Bishop of



The Dome of St. Paul's Cathedral. From a Sketch by Sir Christopher Wren. (British Museum.)

London and others in the Commission, chosen me one of the three surveyors of the repairs of St. Paul's, and to consider of a model for the new building or, if it might be, repairing of the steeple, which was most decayed. On the 26th, the Contagion still continuing," he says, " we had the Church service at home. On the 27th I went to St. Paul's Church, where, with Dr. Wren, Mr. Pratt, Mr. May, Mr. Thomas Chicheley, Mr. Slingsby (Master of the Mint), the Bishop of London, the Dean of St. Paul's (Dr. Sancroft, afterwards Archbishop of Canterbury), and several expert workmen, we went about to survey the general decays of that ancient and venerable church, and to set down in writing the particulars of what was fit to be done with the charge thereof, giving our opinion from article to article. Finding the main building to recede outwards, it was the opinion of Chiceley and Mr. Pratt that it had been so built, '*ab origine*,' for an effect in perspective in regard of the height; but I was, with Dr. Wren, quite of another judgment, and so we entered it; we plumbed the uprights in several places. When we came to the steeple, it was deliberated whether it were not well enough to repair it only on its old foundation, with reservation to the four pillars; this Mr. Chicheley and Mr. Pratt were also for, but we totally rejected it, and persisted that it required a new foundation, not only in regard of the necessity but for that the shape of what stood was very mean, and we had a mind to build it with a noble cupola, a form of church-building not as yet known in England, but of wonderful grace. For this purpose, we offered to bring in a plan and estimate, which after much contest was at last assented to, and that we should nominate a committee of able workmen to examine the present foundation. This concluded, we all drew

Sir Christopher Wren's Favorite Design.
From the Model in St. Paul's Cathedral.

up in writing, and so went with my Lord Bishop to the Dean's."

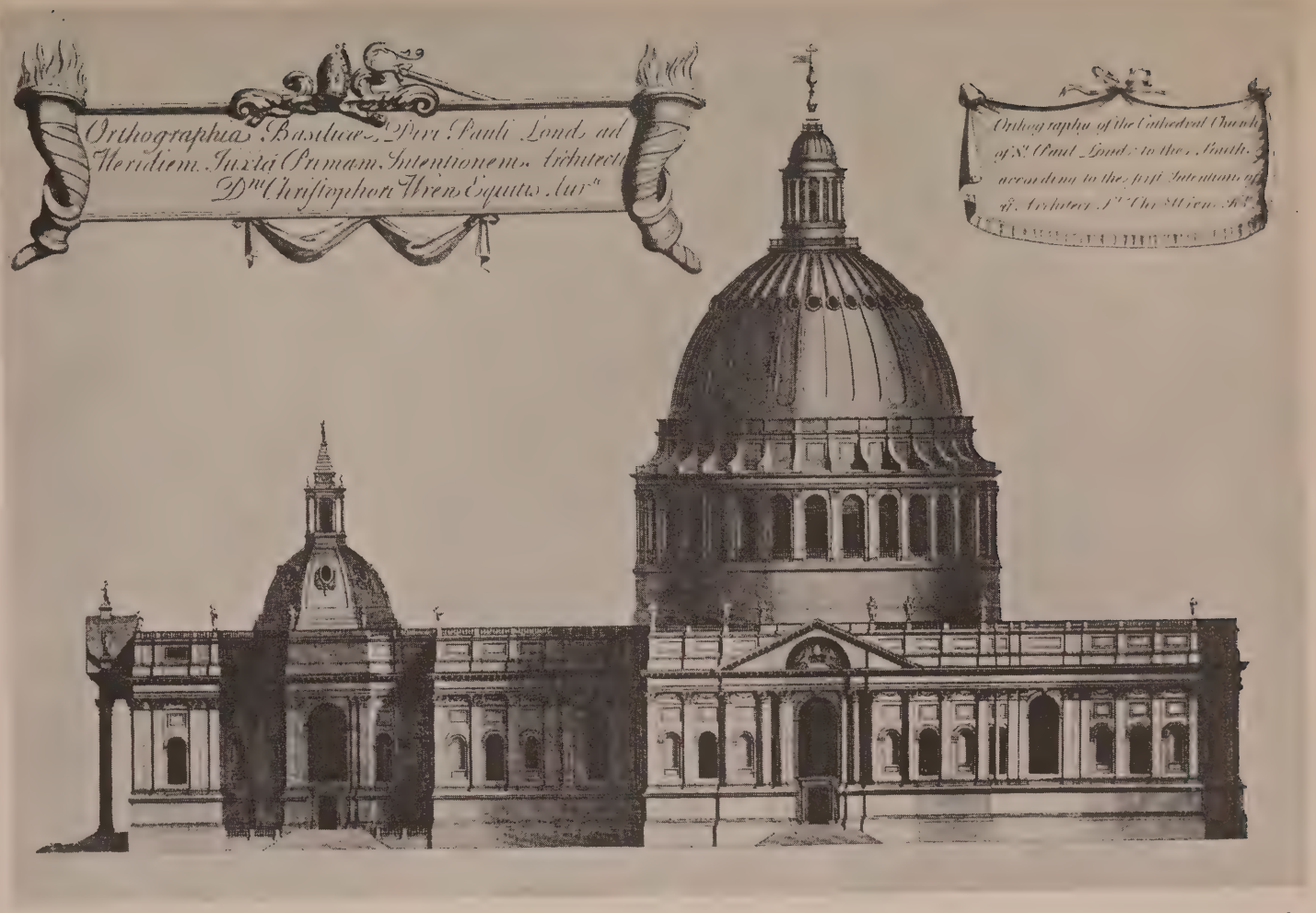
This meeting of the Commissioners, so simply and definitely pictured, awakens our interest. The frank opinion, that the old tower was mean, and that it should be replaced by a form as yet unknown in England, is that of a gentleman who had twenty years before visited St. Peter's at Rome, and had wondered at the cupola "rising at the *internodium* of the transept, of prodigious height, and more in compass than the Pantheon (which was the largest amongst the old Romans and is yet entire) or any other known, which gives a great and admirable splendour in all parts of the city. On the summit of this," he proceeds, "is fixed a brazen globe, gilt, capable of receiving thirty-five persons. This I entered, and engraved my name amongst other travellers—a most truly astonishing work of art." We thus sympathise with his hope that St. Paul's may afford an opportunity for such a noble cupola, "not yet known in England." The reference already made by Evelyn in his dedication to Wren two years previously shows that the possibility of substituting a cupola for the tower had been ardently debated long before.

About ten o'clock on Sunday night, September 2, 1666, the Great Fire originated in a baker's shop near Fish Street Hill, and its progress during the ensuing days westward is detailed by Evelyn and Pepys. The wooden city was practically destroyed. The former, writing on September 7, describes the ruin of the Cathedral, the portico rent in pieces, the stones split, and only the inscription on the frieze left intact. The expensive reparations were dissolved; the six acres of leaded roof were melted away; the ruin of the vaults had burst those of the crypt; and only portions of the building remained.

Soon after the fire, in a general estimate of the cost of reinstatement, a sum of £2,000,000 is put down as "towards the building of St. Paul's Cathedral." Directed by an Order in Council, of January 15, 1667, Wren's first operation, as architect and one of the Commissioners, was to fit up a temporary choir at the west end for daily services until future steps were decided. His previous survey and plans had now a new value, but, strange as it may seem, some of his fellow-Commissioners still clung to the idea that repair rather than rebuilding was possible. Contrary to his opinion, endeavours were made throughout the year to maintain the walls and piers. In April, 1668, the third pillar from the west end fell, and rendered the remainder dangerous.

Sancroft, the Dean, a consistent friend, sent hurriedly for Wren, asking him to bring "those excellent draughts and designs you formerly favoured us with." The Commission, however, still evaded their fate, and in July asked Wren for a design for a choir to begin with, though they purposely declined to consider any estimate, taking it for granted that money would be had to accomplish it; "or, however, to let it lie by till we have before us a prospect of so much as may reasonably encourage us to begin."

Wren replied with a long and able report, pointing out that, until the falling tower was removed, and the ruins cleared, services and processions would be dangerous. He preferred a temporary adaptation in the nave until "the minds of men now contracted to many objects of necessary charge"—the rebuilding of the city, of course, being the main pre-occupation—"shall by God's blessing be more widened, after a happy restoration, both of the buildings and wealth of the city and nation." . . . "It may not prove ill-advised to seem to begin


Orthographia Basilicæ Divi Pauli Lond. ad
Meridiem. Juxtá Primam Intentionem Architecti
Dñi Christophori Wren Equitis Aur.
Orthography of the Cathedral Church
of St. Paul Lond. to the South
according to the first Intention of
the Architect Sr. Chr. Wren Kt.

Sir Christopher Wren's First Design for St. Paul's Cathedral.

something of the new fabric. But I confess this cannot well be put into execution without taking down all that part of the ruin; which, whether it be yet seasonable to do, we must leave to our superiors."

The result was an order by the King in Council, on July 25, 1668, warranting the taking down of the walls and clearing the ground to the foundation of the east end, the old choir, and the tower, sufficient to make room for a new choir, of a fair and decent fabric, near or upon the old foundations, preserving the ashlar of the former western part, evidently the masonry of Inigo Jones' facings, "as shall be deemed useful for the new building."

An Act of Parliament granted, from May 1, 1670, an additional coal duty of two shillings per chaldron, in addition to an existing one of twelve pence, one moiety of the three shillings being devoted to the rebuilding of the parochial churches and St. Paul's. This provided a sensible and effectual revenue for the continuance of the work.

The Cathedral Commissioners were still intent on repairing, but Wren found the site to be so encumbered with the ruins of the enormous walls that he obtained permission to sell the spare materials for the purposes of rebuilding churches and for pavings.

Two years of patching and attempting to use the old walls had elapsed, and an expense of nearly £11,000 incurred before it became clear to the Commissioners that they were pursuing a mistaken policy. Sancroft, the Dean, had all through longed for the fulfilment of Wren's vision of a new cathedral. So great a decision, at such a period of anxiety and unsettlement, naturally was slow in compelling agreement. Wren had prepared various designs, and his multitudinous architectural

employments solidified his view and developed his ideas.

On November 12, 1673, a royal warrant was issued, addressed to the Lord Mayor and 108 others, setting out the history of the operations, mentioning several designs, and ordering a model of wood to be prepared and selected by His Majesty. This is the remarkable design of which the model exists at St. Paul's. The subject of this first complete design for a Protestant Cathedral is fascinating. The originality, power, and beauty of the plan, with its novel and wonderful internal beauties, have always commended it to architects. When a new cathedral for Liverpool was first mooted, about forty years since, the late Precentor Venables, of Lincoln, very strongly urged the carrying out of this complete masterpiece of Christopher Wren in its integrity. Though this may be to admit the failure of English architecture, no one will deny that the opportunity, if taken, would have achieved a success greater than any possible to a revival in this age of pseudo-mediæval art.

The question may be debated whether St. Paul's Cathedral was built or rebuilt by Sir Christopher Wren. An answer in either sense would not be wholly true. Work that was undertaken in the first place as necessary repair extended, through the suggestion and foresight of the architect, into a scheme of extensive improvement. These improvements cannot be deemed radical, though they reflect the entirely new architectural ideal of the Italian Renaissance.

The consideration of a general scheme of renovation and improvement became, however, endued with a new and fearful urgency through the outbreak of the Great Fire a few days after the architect's plans and report had been adopted for execution. Not only was the work of repair

Wren's First Design for St. Paul's Cathedral (a). Interior view by J. E. Goodchild. (R.I.B.A. Collection.)

immensely increased by the damage caused by the fire, but the possibilities of improvement also became more practicable. The consternation of the public mind and financial difficulties were now added to the problem. Progress, however, was urgent; time and much money had been spent in providing for the conduct of services in the less injured parts of the old fabric, but the heavy expenditure proved to be only for a temporary purpose. It gradually became evident that circumstances were forcing the abandonment of both repair and improvement for the greater operation of rebuilding.

This rebuilding caused a discovery of ideas and a searching of hearts, which to onlookers more than two centuries after affords a spectacle of remarkable interest. A contest between ecclesiastical and architectural ideals is apparent. The deeply-rooted conservatism of religious tradition, together with the new force of Puritanism, were face to face with the now irresistible classical taste of the world; a new power, that had dethroned the mediæval art of building, dissolved its guilds, destroyed its crafts, and that despised its traditions.

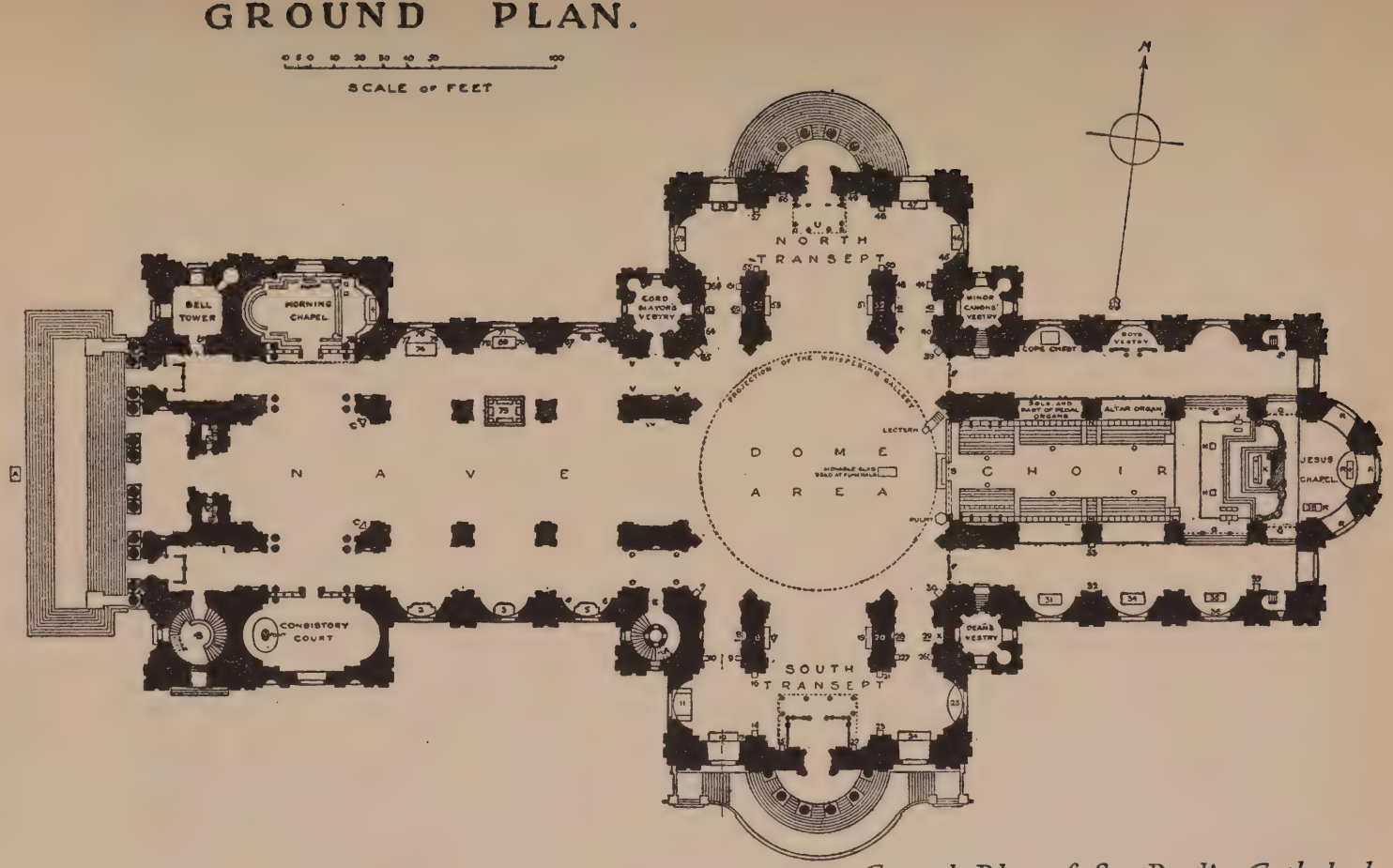
The position resembles that of rebuilding Westminster Abbey, supposing a calamity that had involved its destruction. To us it would not seem to offer much subject for debate. We, at any rate, have no architectural idea other than the correct imitation of that which has been. Our generation has already witnessed the rebuilding of the campanile of St. Mark's at Venice, from the foundation to the finish, and plans have been set afoot for the restoration of the destroyed Cloth Hall at Ypres, the pre-eminent monument of mediæval commerce.

The age of the Restoration, however, was nearer both to the death-bed of the Middle Ages and to the

sunrise of the Renaissance ; and it possessed entire self-confidence ; the quality that modern architecture most significantly lacks.

St. Peter's at Rome, the most venerated shrine of Western Christendom, had been completely reconceived as a triumph of civilised over barbaric art, and existed as evidence, immense and incontrovertible, of the new architectural spirit. Enlightened progress characterised the arts. Nowhere appeared any prophet of a return to the dimness of the Dark Ages or of the Gothic revival. The arts of painting and sculpture shared the new light. Science and philosophy had already awakened in the track of discovery. The world was now new as well as old. No hesitation was therefore entertained by Wren about the current or proper value of the ruined and uninspiring remains of the old Cathedral. The clerical tradition had to submit to necessity in facing the unwelcome reality of rebuilding. The authorities had not to weigh and decide the style of architecture to be employed, as in the modern instance of Liverpool Cathedral, that is, of determining artificially an unnatural question ; in all the schemes submitted to the Commissioners for the improvement or rebuilding of St. Paul's, the modern European, but classical, architecture was admitted without question.

It is at once singular and significant that Wren did not suggest the possibility of restoring or rebuilding the old Cathedral in its ancient style ; on occasions he exercised himself with a measure of success in Gothic design ; the gateway at Christ Church, Oxford, and the graceful crown of St. Dunstan's in the East are examples. It appears that he regarded it as architecture unworthy of the highest purpose and out of date. We cannot regret, even to-day, the result of his sincerity of con-



Ground Plan of St. Paul's Cathedral.

viction. But the first and great design for a completely new Cathedral, after prolonged debate, was laid aside as impossible. The new wine burst the bottles.

Wren, though disappointed of a wonderfully worked-out vision, yet persevered upon the path of obedient duty to the successful achievement of the very different building that we all know and love; and in this he gives a manifestation of nobility of character altogether admirable. Great buildings, in modern days, and doubtless, if we only knew, also in ancient times, seem to comprise an element of tragedy in their attainment. The Duomo, at Florence, strained almost to breaking the tempestuous spirit of Brunelleschi. The long-drawn-out difficulties of St. Peter's were only reduced to order by that patient giant Michael Angelo; both reflect the suffering of genius in conflict with circumstances, and pour light upon the triumphs of their architects. Of this ordeal Wren had a full trial, but to him alone belongs the grief of knowing that a fundamentally greater scheme was laid aside, and the full fruition of his genius had to be forgone.

Controversy continued for a year and a half, resulting in another design, accepted by Royal Warrant* on May 14, 1675. Of this it must be sufficient to say that it contains the elements, as yet undigested and unco-ordinated, of the previous building. The basis is clearly a plan of the traditional mediæval type, including the features of Old St. Paul's as it left the hands of Inigo Jones, and Wren's original central tholus and cupola. We can also discern in it some results of his practice in the architecture of the City churches. The success of the

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* Wren's earlier designs for St. Paul's Cathedral are illustrated in Mr. Ward's article, p. 193.

Wren's First Design for St. Paul's Cathedral (b). Interior View by J. E. Goodchild. (R.I.B.A. Collection.)

plan is remarkable in combining the traditional, if not obsolete, nave and aisles with a great central auditory. The architectural supports of the Dome on plan, the enlargement of the west end, with its ingenious and beautiful treatment of the chapels, and the widened western bay of the nave, all indicate the unsparing skill and devotion of the architect to the distasteful task of redesigning the Cathedral. The cherished scheme appears to have been wholly forgotten. All the important elements of the one are absent from the other. The treatment in one architectural order of external height is replaced by a dual order. The hollow curved lines of the transept angles, a remarkable effort to induce the swelling curves of the Dome to contrast with its basement, are abandoned, the square buttressing masses of the vestries taking up the office of giving support to the internal angle of the crossing. Many sketches and drawings illustrate the evolution of the result, and possess peculiar interest for the practical designer. The factors essential to conformity with the decision to adhere to the former grouping were honestly maintained, and the design grew to its completion without apparent regret or wilfulness on the designer's part. The extended length of the building becomes a foil to the unbroken simplicity and force of the central circular form. The western towers, marvels of picturesque grouping in themselves, contrast by their richness and variety of sky-line with the breadth of the greater forms. The western front, so unsatisfactory a problem of architectural composition in mediæval examples, and without a really successful solution in any great Renaissance church, is dealt with by a masterful extension of the towers beyond the limit of the side aisles, and a super-portico, skilfully diminished, harmonises the proportions of Inigo Jones'

lower portico with those requisite to the pediment, which is thus sufficiently detached from the towers to assert its independence and provide them at the same time with a harmonious central feature.

A month after the issue of the final warrant, Wren himself laid the first stone of the new Cathedral, without ceremony, on June 21, 1675. Demolition proceeded within the area of the new building, which was considerably less than that of the old ; the old west front, which was well outside the new, was not finally demolished until eleven years later, twenty years after the fire.

Wren expressly avoided using the footings of the old walls. He rejected wisely and wholly the notion of economy in this matter. The lines of the new were planned to avoid coincidence with the old walls. Wren's scientific mind was intent upon obtaining an accurate knowledge of the facts underlying the proposition which it was his duty to maintain. He thoroughly tested the ground of the foundations of his superstructure. The years of anxious struggle with the old bending walls, and the time devoted to estimating the possibility of securing that ancient enemy, the old central tower, had confirmed his natural caution ; and he did not make the mistake of underestimating the pressure that he was imposing upon the foundations of his greater building.

Upon digging the foundation he found the graves of later ages, the burial places of Saxon times ; below the cemetery a layer of very close, hard brick earth, about six feet in thickness, was discovered ; below this a bed of dry sand, then sand and water containing shells, which Wren wrongly supposed to be sea-shells, a conclusion only proved false by modern marine biological research. This was about low water of the river ; then he came upon the hard " sea beach,"

View of the Interior of St. Paul's. From a Painting by Hanslip Fletcher.

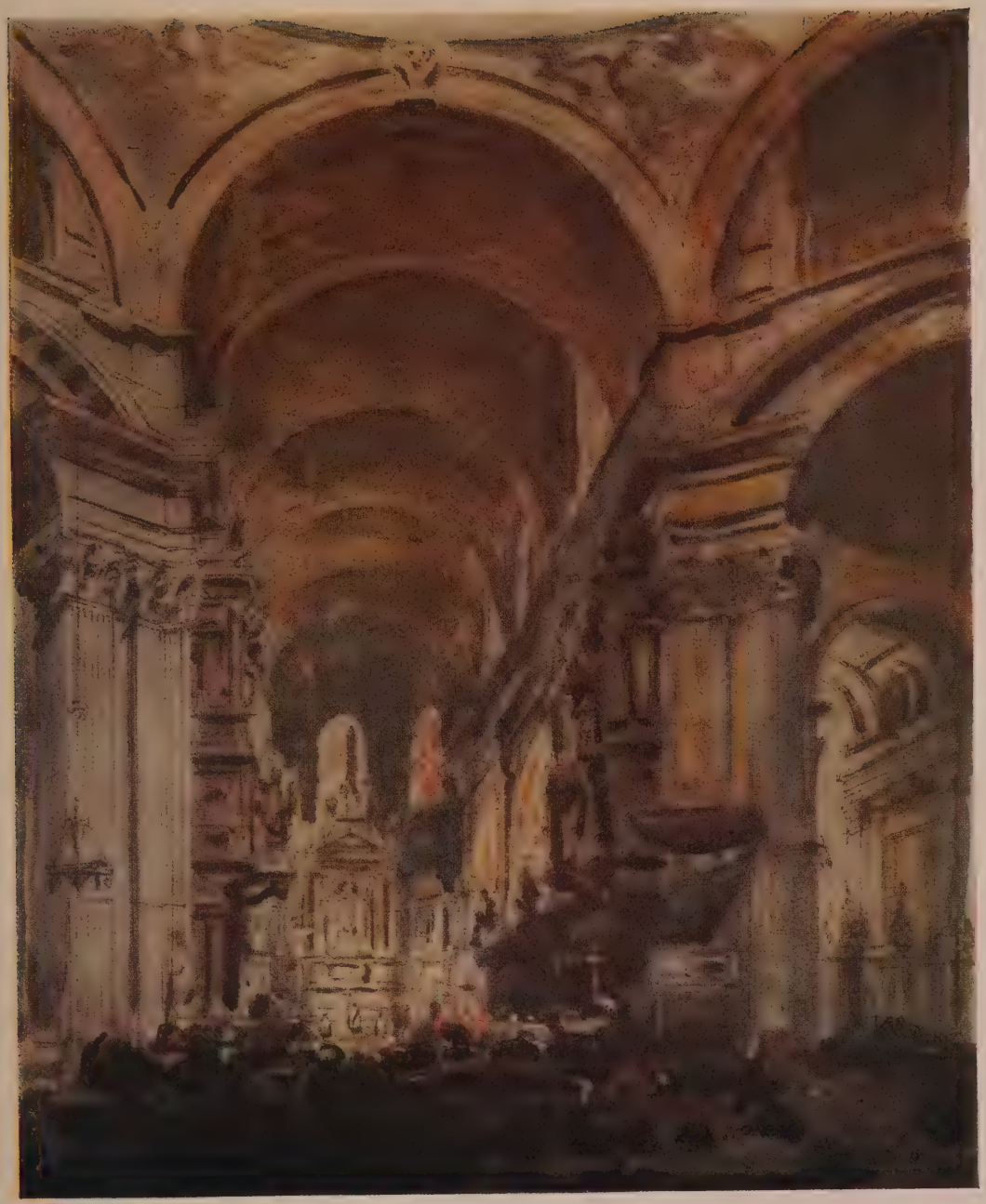
lower portion with [illegible] to the pediment, which is thus [illegible] detached from the towers to a [illegible] with a harmonious central [illegible].

A month after the issue of the final war[illegible], Wren himself laid the [illegible] stone of the new Cathedral, [illegible] ceremony, [illegible] June [illegible]. Demolition pr[illegible] within the [illegible] the new building, which [illegible] ably less than that of the old; the old west f[illegible] was well outside the new, was not finally de[illegible] until eleven years later, twenty years after the fire.

Wren [illegible], avoided using the footing[illegible] old walls. He rejected wholly and wholly the [illegible] [illegible] planned to avoid coincidence with the old walls. [illegible] scientific mind was intent upon obtaining [illegible] knowledge of the [illegible] underlying the pr[illegible] it was his duty to maintain. He thorou[illegible] ground of the foundations of his superst[illegible] [illegible] mistake of underestimating the pressure [illegible] imposing upon the foundations of his g[illegible]

Upon digging the foundation he fou[illegible] of later ages, the burial places of Saxon [illegible] [illegible] earth, about six feet in thickness, was disco[illegible] below this a bed of dry sand, then sand and wate[illegible] containing shells, which Wren wrongly supposed [illegible] sea-shells, a conclusion only proved false by [illegible] This was about [illegible] [illegible] upon the hard " [illegible]

View of the Interior of St. Pa[illegible]
From a Painting by Hanslip Fletcher.



and finally reached the underlayer of London clay, about forty feet down. At the north-east corner a deep pit was found that had been filled up. Here Wren refused to employ piles, and built a pier of masonry, ten feet square, from the London clay upwards, to within ten feet of the ground level; from this pier arches were turned on to the adjacent foundations of the chancel, and an effective base was provided.

Few developments of public taste at this era in Europe are more interesting and important than the growing appreciation of public spaces and planned gardens. It may easily be conceived that Evelyn's travels in Italy, the extensive squares and gardens in Paris, and the glamour of Bernini's great colonnade at St. Peter's, recently completed, and to this day one of the architectural glories of Europe, all operated on Wren's imagination. The magnificent scheme of colonnades at Greenwich in combination with the twin domes, proves his intelligent grasp of the value of architectural adjuncts to a central building, and permits us to foresee what he might have achieved at St. Paul's. But such dreams could not be realised; the classical piazza faded into the reservation of a forty-foot roadway around the Cathedral. England, that citadel of private liberties and vested interests, admitted this advance upon any previous regulation. The problem of the streets around the site, with all its opportunity, was too difficult, and remains for us to-day, crying for solution, multiplied, perhaps, a hundredfold in cost.

Wren prepared a masterly plan for colonnading the irregular churchyard with entries to the streets, including a circular baptistery on the axis of the church, after his great design for the rebuilding of the city had evaporated in the heat of urgent reconstruction. Even a modified

but very skilful design for the line of the surrounding railings was mutilated at a later stage, and we share, without hope of any effective redress, his mortification at the perpetual loss of civic grandeur that the Cathedral building had begun. The public mind of to-day has failed to grasp the present opportunity of laying out an architectural thoroughfare of approach from the contemplated new bridge. We suffer from the chronic artistic maladies of our race. We worship selfishly at the shrine of a cherished ideal. There is a private liberty of opinion which involves the continual sacrifice of artistic ideals.

On the accession of James II, in 1685, a new Commission was appointed, empowered to take down what was yet remaining of the old fabric and to carry on the works as hitherto. By the beginning of this year the walls of the choir with the aisles were 170 feet long, 121 feet broad, with the arched vaults below the pavement finished, the new Chapter House and vestries, the two circular porticoes and the cupola piers were all brought to the same level. In June 1688 the timber for roofing the aisles of the choir was contracted for. In 1708 the Commissioners considered a report on the covering of the cupola.

The records, external to the volumes of building accounts, are meagre. We are told from year to year that the Cathedral of St. Paul continued with undeviating progress, again and again. The choir was opened for Divine Service on the Thanksgiving Day for the Peace of Ryswick, on December 2, 1697, and the Morning Prayer Chapel on February 1, 1698.

The works had proceeded without intermission for thirty-five years, until in 1710, when Wren was seventy-eight years of age the topmost stone of the lantern was laid by his son, Christopher, in the presence of his father

St. Austin's Church, North Side of Watling Street. From an Engraving by W. Preston from a Drawing by W. Pearson, 1810.

(it seems doubtful whether the old architect ascended the scaffold), and of "that excellent artificer, Mr. Strong, his son, and other free and accepted masons, chiefly employed in the execution of the work."

The position of the architect, eminent and authoritative, indispensable and irreplaceable, was not permitted to be one of either peace or security. The age was one of cabals. His apparently meagre salary of £200 per annum was determined at so moderate a sum by his own choice, he always preferring the public service to any private ends. In 1696–7 an Act of Parliament for completing and adorning the Cathedral contained an unkind clause "to suspend a moiety of the surveyor's salary until the said church be finished." Even then Wren had to appeal in 1711 for the payment of the balance due. At last, after fifty years spent in continuous duty, at the age of eighty-five, he was dismissed from his position as architect, and a despicable place-hunter of the name of Benson (ridiculed by Pope) was appointed in his place. The ground of complaint could only have been the great age of the master, whose faculties were, as a matter of fact, and continued to be, unimpaired—a very Moses of architecture.

The erection of St. Paul's Cathedral is remarkable, not only on account of its architecture, but as a building operation of great magnitude, successfully and scientifically brought to completion. The church, vast both in area and in height, is, in its achievement, the greatest triumph of the art and science of construction in the kingdom. It will be easily grasped that so great a work implies as great self-confidence and persevering determination, and that the difficulties that were overcome were proportionate to the scale of the undertaking. The measure of this proportion will be sympathetically

realised by any who have been charged even with the responsibility of smaller works, for it seems especially the case in building, that bulk multiplies rather than diminishes the labour of production.

But the great effort did not fail of accomplishment, the work was done and the vast inheritance of this glorious building is bequeathed to us. The attempt to measure this effort by present-day standards tells us little. We can only say that Wren's forefathers counted the cost, provided for it, and built.

Thus they raised a monument to their age on a scale, we fear, impossible to our own generation; but, at the least, we can strive to understand and enjoy this masterpiece of national architecture.

SOME RECENT INVESTIGATIONS AT ST. PAUL'S. *By Mervyn E. Macartney, B.A., F.R.I.B.A., F.S.A., Surveyor to the Fabric of St. Paul's Cathedral.*

I FIND it rather difficult to speak of St. Paul's at this time for many reasons. First, the fact that a Commission is now examining the building to some extent silences me; secondly, some important researches concerning Wren's original intention regarding the design of the Dome are not at the moment sufficiently far advanced for publication; and thirdly, I have found that many of the statements concerning the building are founded on such insufficient data that they are not in accordance with more recent discoveries.

St. Paul's Churchyard is about fifty feet above ordnance datum line, and the Crypt floor is eight feet below that, and the bottom of the footings, consisting of two courses of rough stone, is five feet below the Crypt floor. These footings rest on a stratum of clay on the average five feet thick. When we excavated to this level we found it damp, and also that the builders had thrown down on it large blocks of stone, evidently portions of the old Cathedral. It is my belief that soon after Wren built the piers in the Crypt he found the clay was spewing up, and therefore built the arches

joining up the piers to the N. and S. transept walls and the nave arcade as well as the massive piers under the floor of the Dome. The next thing we discovered was that Wren had built a causeway of concrete from pier to pier on which he set his columns to support the church floor.

I hope in time to be able to find out the steps subsequent to the Warrant Design by which Wren evolved the building as it stands. As I have said, I am at the present time making a careful investigation into this matter, but my theories are not sufficiently developed to be published.

At present I believe that Wren felt he achieved perfection in the "Model Design" which he would have been satisfied to carry out with scarcely any modification, and in my opinion it would have been one of the most rhythmical and perfect buildings ever created. But it was not to be, and I cannot help feeling that the present design, fine though it is, was perpetually on Wren's mind, which only evolved it through great anxiety during its execution. This fact has an important bearing on the present instability of the building. It is certain that considerable alteration in design took place after the balustrade level was reached. The Western Towers were magnified from quite small cupolas to their present dimensions without any compensatory strengthening of the substructure. The Dome, however, seems to have gone through a reverse process and to have been minimised, which may have been due to Wren's desire to lessen the load on the eight piers which are known to have commenced showing signs of weakness at this time. Unfortunately it has resulted in a somewhat uneven distribution of weights which may be to some extent responsible for the present trouble.

St. Paul's Cathedral. Photograph showing Veneering under S.W. Quarter Dome.

As far as the Warrant Design is concerned, it is evident that Wren kept to the plan of this, and also to the elevation internally up to the level of the main cornice, but the Dome was fortunately abandoned.

One thing is abundantly clear, that long before the building was completed settlements took place. We have the account of Strong for repairs with Portland stone averaging six inches thick to piers. The total amount being 30,000 superficial feet, or enough to make good the entire facing of the piers of the N. and S. transept and bastions. I do not suppose this is what was done, but that the facing was carried out to the bastions and other portions of the walling adjacent to the Dome as well as the piers. We found that this veneer to the ashlaring was fixed to the wall by dowels or cramps of iron, often only by lead run in grooves from the course above. A large number of the Egg and Tongue ornaments are merely attached to the adjacent stone by these very insecure methods.

I have had the piers plumbed, and the result is not at all satisfactory. They show an inward inclination on an average of about three inches at the level of the necking of the main pilasters. In this connection it is curious to note that there is a comparatively small settlement of the main arches, at most about three-quarters of an inch at the crown.

These arches are very skilfully designed in double rings with an occasional bond between them.

The two drums of the Dome rest on these bands, which are four feet thick and at right angles to the piers where visible from below and adjusted to where they meet the drums. In fact, they are really pendentives.

Finally, I would refer to the method of fixing the ornaments of the lantern. The bases of all the vases

are hollowed out and fit over a corresponding excrescence in the attic cornice. The result of storms during 200 years at an altitude where the wind has been calculated to reach a velocity of 100 miles an hour has been to wear down the stone by nearly a quarter of its bulk. We had to secure some of these ornaments with wire and rope till the summer before last, when we were able to erect scaffolding and renew the perished portions. It is difficult to realise that the stone-work of the lantern attains a height of seventy-five feet. So careful was Wren of the construction of the lantern that he had it erected, without mortar, in the Cathedral yard before being hoist to its present position.

Under some of the ornaments were found coins of contemporary date.

St. Stephen's Church, Walbrook. From a Drawing by T. H. Shepherd, 1811.

St. Stephen's Church, Walbrook.
From a Drawing by T. H.

ST. PAUL'S CATHEDRAL. Observations on Wren's System of Buttresses for the Dome Piers and on some other things. *By Somers Clark, F.S.A., Surveyor to the Fabric of St. Paul's, 1896–1906.*

EARLY in the year 1864 I entered as a pupil the office of Sir (then Mr.) George Gilbert Scott. The Gothic movement was then at its full height. Mr. William Burges informed us about that time that "there is no salvation out of the thirteenth century." We read diligently Pugin's "True Principles of Christian Architecture."

As may be supposed, Westminster Abbey being in the charge of Mr. Gilbert Scott, we enjoyed every opportunity for the study of that matchless building. We, somewhat loftily, picked St. Paul's to pieces.

The impression is with me that it was Burges above mentioned who about that time read a paper showing how St. Paul's Cathedral could—at least in part—be reduced to true principles by several structural changes, but more especially by removing the lead-covered timber Dome and exposing to the eyes of all men the great brick cone on which rests the stone lantern.

There was another piece of naughtiness on which

the critic fell with great severity, as others had done before him. Wren was accused of building one half of the church to hide the other. It was the great pieces of wall which so completely hide the clerestories which were under condemnation.

It is especially to the character of these walls that I will presently call attention, and, I hope, completely justify their existence.

For even in the remote Gothic days I had a strong but lurking admiration for St. Paul's Cathedral, and soon, under the friendly aid of the Clerk of the Works, began to study the beautiful ingenuity of constructive forethought and resourcefulness it displays. Like, yet unlike, to what we find in its mediæval brethren.

Wren, who had already made designs for carrying on Inigo Jones' schemes for "flagging" and entirely transforming the interior and exterior of the old Cathedral, had proposed, and his proposal had been accepted, to remove entirely the centre tower and establish an octagon in its place, as had been done so successfully at Ely. We see a drawing of this scheme at All Souls College, Oxford.

This central tower, "the steeple" which Pepys saw the workmen demolishing, was itself an immense thing.

The church founded very shortly after the Conquest had, as usual, a tower at the crossing and, as had been the case with most of our Cathedrals, through the course of centuries the piers of this centre tower had been enlarged and encased with added masonry to enable them to carry the weight imposed on them of a tower far in excess of anything intended originally. Wren gives us the vertical measurement above the ground—240 feet. The Tower as it rose above the walls of the church was, with its buttresses, fully 60 feet square.

The church itself had been planned on a lordly scale. It was not only considerably the largest church in England at that time, but one of the largest in Christendom. Its width was, within the walls, not less than 100 feet (York Minster, the only other church in England so wide, did not attain such dimensions until the fourteenth century), but when in the thirteenth century the immense eastern limb was added, extending twelve bays beyond the centre tower, there was no other church in Europe of such length, nor had any other steeple attained the height of 500 feet. Not until St. Peter's at Rome was enlarged as we now see it was the length of St. Paul's exceeded.

I venture to call attention to the bigness of the scheme above referred to because I doubt whether my countrymen in these days realise what a structure it was.

St. Paul's was not only a very large building, it had a long and interesting history. Unless we study this a little we cannot learn how the present church grew to what it is; for new St. Paul's is completely a child of the old.

Old "Paul's" was held in strong affection by London. It had become an "institution." This becomes manifested when we bear in mind that, so soon after the appalling tribulations of the Plague and the Fire, the people should in a short time determine to rebuild the Cathedral.

It was at first proposed to repair "Paul's" for use. Wren pointed out its deplorable condition, and Pepys certainly supports him. Nevertheless, in accordance with the instructions he received, he did his best with the Nave, patching walls and columns, but he warned the people of the imminent danger. In 1668 down came one of the old columns in the Nave, where was the

temporary church, and from that time preparations were begun for building an entirely new Cathedral. It was in this year that Pepys makes the observation, " That the late Church was but a case wrought over the old Church. You may see the old pillars ſtanding whole within the walls of this."

What, then, was this " late " church ?

It was the mean skin or flagging with which Inigo Jones had already refaced a large part of the Nave; the " old " church was the massive Norman Nave of the interior, of which Hollar gives us a poor drawing. It muſt certainly have been one of the fineſt specimens of this solemn and grand type of building. Hollar shows us that the south side of the Nave, externally, had already been " flagged " over at the time he made his drawing.

The " old " church, in the round-arched Norman ſtyle, was evidently built in the manner of moſt of our old buildings. The architects in those days made use of ſtones of quite moderate size for their ashlar facings. Who can wonder in view of the difficulties of transport ? Within the facing they made use of rubble masonry embedded in lime mortar.

Wren in building St. Paul's did much the same thing, except that for his ashlar facing he made use of larger blocks and of a much better ſtone than the older builders. As everybody knows, the goodness of this method of work depends on the excellence of the mortar and the quality of the ſtones, both for facing and rubble. At Bury St. Edmund's, at Lewes Priory, we ſtill see great masses of walls thus built, the facing ſtolen, but the solid heart remaining after several centuries of exposure. The alternative may have been seen at Chicheſter Cathedral, where, built with poor mortar, the " ſteeple " in the middle of the church collapsed in

1861. The same thing had happened in many other places.

There is ample evidence that the walls of Old St. Paul's were built in the way above described, but as they stood, and to a considerable extent withstood, both the assaults of a good five hundred years of time and the terrors of the Great Fire, we can feel assured that the work had been well done.

Possibly many of my readers will never have seen a specimen of "flagging." The north front of the N. Transept of Westminster Abbey Church was a fine example, but in the "Gothic" manner. Portland stone slabs stood up on end with the most precarious attachment to the venerable walls behind. You could see down horrid clefts and chasms six or eight feet deep between the old and the new. Although not begun until the first quarter of the eighteenth century, it was falling down by the middle of the nineteenth.

Wren had surveyed with care many big churches. It is not to be doubted that he found in all of them the masonry face and rubble hearting. Old "Paul's" was no exception, and the long life of that building up to his time made it evident that a structure so built could be depended on; indeed, the fact that the four piers supporting the centre tower must needs be attacked with gunpowder and the battering-ram was a testimony of their stability.

Reading between the lines in "Parentalia" and elsewhere, we can tell that Wren had a very adequate knowledge of the merit of good ashlar masonry. But we need not go outside St. Paul's to see this fact exemplified. That part of the building which so magnificently arrests our attention, the whole of the cupola, which, although it is so large, is really a masterpiece in

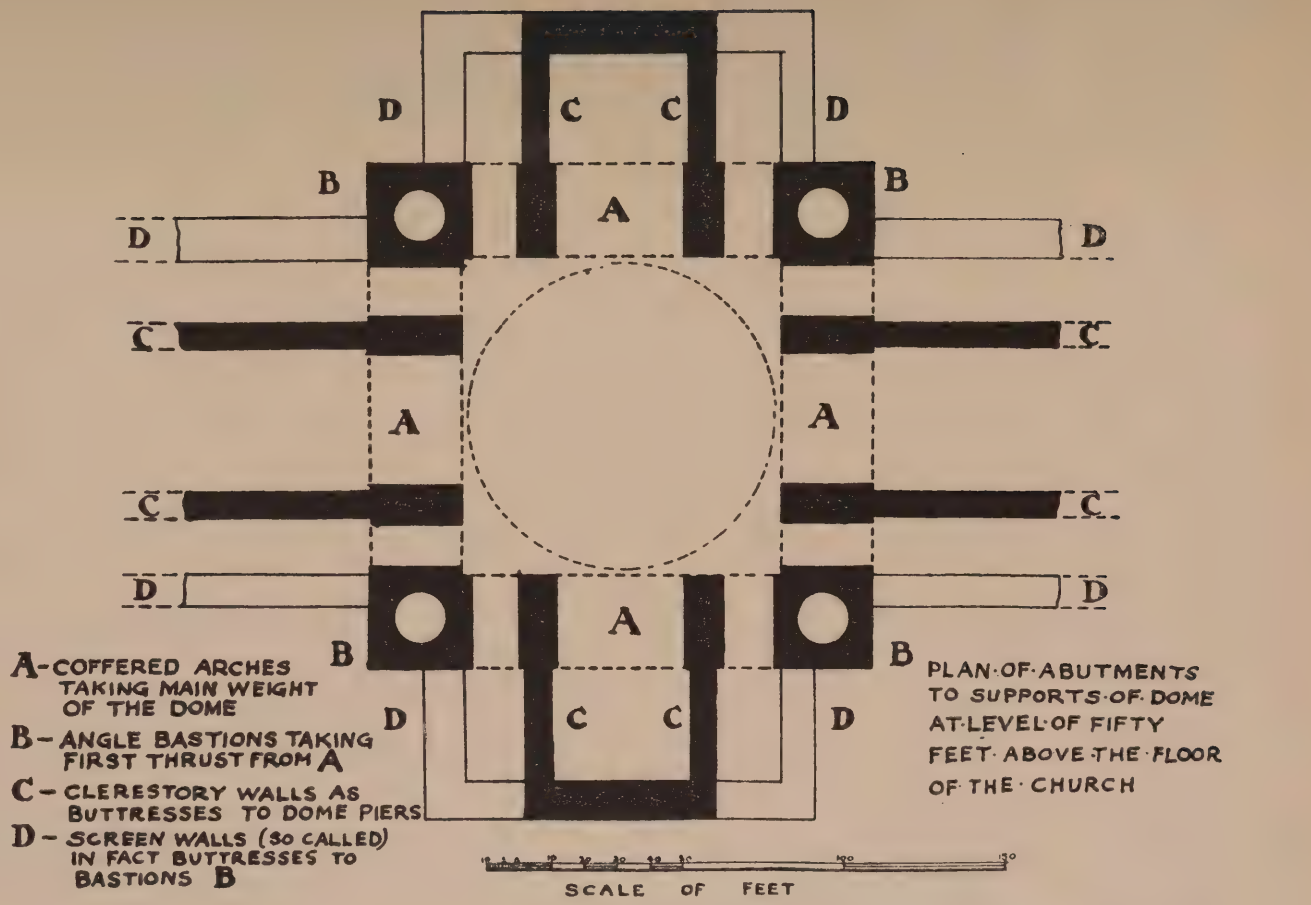
stability and yet in lightness of construction, is largely of fine Portland stone masonry. It is to me impossible to suppose that Wren would not, by preference, have built the lower part of the eight piers which receive directly the great weight of the vast superstructure of good masonry, at least from the level of the church floor to the springing of the quarter domes. Had this been done how much anxiety we should now be saved.

But there is the Committee to be reckoned with. What was Wren's relation to the Committee which held the control of operations? This body, it is clear, had a strong influence, partly for good, partly for evil. First and foremost we have to thank it that Wren's earlier designs were both of them swept aside.

Representing, as we must suppose, the public mind, it was not at all disposed to put up with anything manifestly less in importance than the historic "Paul's." Height and bulk were demanded, and certainly Wren gave it them not only in the imposing mass of the body of the church, but above all in the surprising beauty of outline and dignity of the Dome.

On the other hand, we may reasonably suppose that it is to the Committee's penny-wise pound-foolish policy we owe it that good masonry was not made use of where it was most necessary. What an argument lay ready against the suggestions of the architect! It was but necessary to point to the old building, not seriously ruined by structural decrepitude (the fire damage was no matter of age or weak construction).

Started on the new lines, how triumphantly Wren accomplished his work! Those things which some say were forced upon him, as, for example, the North and South Chapels behind the Western Tower, although they have to some extent on the outside an appearance of


A- COFFERED ARCHES TAKING MAIN WEIGHT OF THE DOME
B- ANGLE BASTIONS TAKING FIRST THRUST FROM A
C- CLERESTORY WALLS AS BUTTRESSES TO DOME PIERS
D- SCREEN WALLS (SO CALLED) IN FACT BUTTRESSES TO BASTIONS B
PLAN OF ABUTMENTS TO SUPPORTS OF DOME AT LEVEL OF FIFTY FEET ABOVE THE FLOOR OF THE CHURCH
SCALE OF FEET

St. Paul's Cathedral. Abutments System of the Dome.

additions, what a magnificent effect they have as we enter the church by the West door. They belong, absolutely, to the places they occupy, turning the western bay of the Nave into the finest part of the interior.

And now, at last, we come to the buttress walls, which the critics tell us are mere screens built to hide the clerestory and the flying buttresses. In my early days I had often wondered why Wren had made these walls so thick. Their substance is from eight to ten feet, but my friends who knew all about " True Principles " told me that the style was full of subterfuges and make-believes : in fact, there was " no salvation out of the thirteenth century."

Many years after this, as I was standing in the colonnade surrounding the drum of the Dome, and looking westward, thinking of the anatomical value of each part of the structure, the thing came upon me with a flash.

Obviously the stability of the great coffered arches which carry the Dome was guaranteed by these much-maligned walls.

On my plan these arches are lettered A. Throughout the design of the real architecture of the building, that which it is easy to distinguish from the Classic or, more truly, Italian petticoats drawn over it, there was ever present to Wren the necessity of providing against the very unsatisfactory nature of the site and its geological conditions. In the " Parentalia " we read of his apprehensions. We have to examine the building itself to admire the precautions he took.

He spread out the footings so as to float the Dome structure over the largest available area, a spread of 250 feet east and west and 250 feet north and south.

St. Michael's, Paternoster Royal. From a Water Colour Drawing by J. Coney, 1812.

If we take a measurement diagonally from outer angle to outer angle of the bastions or angle masses, the measurements are about the same.

If we examine the Dome piers on plan and the attendant masses of masonry, we shall see that there are four systems of arches the thrusts of which have to be resisted.

Wren has, as far as may be, accumulated these thrusts upon four square bastions, B, each of them about thirty feet square. These were, in his opinion, not in themselves of sufficient mass to resist the thrusts they received.

Had he piled stone upon stone so as to resist the thrust by mere weight, he clearly saw that with his unsatisfactory subsoil the bastions would sink and endanger the value of his widespread area of Dome foundations. He determined to maintain his wise system of spreading weights by buttressing the bastions and thus immensely increasing the area of resistance.

The great coffered arches, A, would have been without lateral support except that of the bastions, as the lateral resistance offered by the arcades and clerestory walls of the Nave, C, Choir, C, and Transepts, CC, do not in the least resist the thrust of the coffered arches, A. The aisle outer walls, D, D, D, D, carried upwards as Wren has done, give the most potent resistance, and also act as buttresses to receive the thrusts of the aisle vaults and of the flying buttresses which maintain the high vaults.

My plan is taken at a height of about fifty feet above the church floor, just higher than the vaulting of the aisles. At this level the walls are continuous, broken neither by the arcades nor windows, and their value as buttresses can be well appreciated.

Examining Wren's management of the roots of the Dome supports as seen in the Crypt, we see that he continues north, south, east and west the bases of the eight Dome piers. He thus secures a more or less continuous structure extending some 250 feet.

It might be supposed that the vaulted ceiling of the Crypt carrying the main floor of the church would give some lateral rigidity : it is, however, but a light structure, sufficient for the work and no more. Internal evidence shows that it was not set in its place until the last thing. There are certain settlements in the great walls which have in no way disturbed the levels of the floor—building the Crypt vaults last saved it from the perils of an accumulation upon it of masses of masonry, scaffolding, etc.

The Great Fire of London, 1666 (showing Old St. Paul's involved in flames). Engraved by J. Stow from an Original Painting by Jan Griffier ("Old Griffier").

THE CRAFTS AT ST. PAUL'S.

By Laurence A. Turner, F.S.A., Past Master, Art Workers' Guild, and W. Henry Ward, M.A., F.R.I.B.A., F.S.A.

TWO hundred and fifty years have passed since the building of St. Paul's Cathedral was begun. The greatest English building of the seventeenth century stands midway between the great buildings of to-day and those of the Middle Ages, and bridges the gap which separates the mediæval cathedral builders from the builders of our own day. It offers, therefore, a valuable object-lesson on the process of evolution which building methods have passed through between the completion of Westminster Abbey and that of the new County Hall.

Among the aspects of this evolution none is more important than the quality and status of the craftsman. In the Middle Ages he had some share in the design of the fabric and was almost wholly responsible for the details; to-day he is too often little more than a passive tool for carrying out literally the instructions of another mind. Many causes have been assigned for this decline. Some would attribute it to the "foul torrent" of the Renaissance, others to the arrogant encroachments on the part of the architect. The former theory is sufficiently disproved by the excellence of craftsmanship almost

universal up to the close of the eighteenth century; the latter by the fact that the architect of every period considers himself fortunate if he can command the services of craftsmen with the initiative to give his ideas visible form without requiring direction and supervision in every detail.

If the craftsman is no longer the architect or even the contractor for the building, this is merely part of the specialisation imposed on all forms of activity by the growing complexity of civilisation. That he is no longer as a general rule endowed with the individuality and creative power, or even with the technical skill of his forbears, is to be attributed more than to any other cause to the rise of industrialism, which has turned the world into a place where cheapness is the first consideration and there is no room left for him.

In the age of the Restoration machinery had not yet crowded him out, and the course of building evolution was not half run. The professional architect was supreme, but he had at his beck craftsmen in every branch of structure and decoration still capable of delighting in and thus imparting life and individuality to the parts entrusted to them, while contributing to the harmony of the whole devised by the architect. Nor had the general contractor yet been evolved to intervene with his organisation between them and him; for it was still the custom to allot—as is still often done north of Trent—the works appertaining to each trade to one or more contractors who are themselves craftsmen in that trade.

Fortunately it is possible in the case of St. Paul's to study the conditions obtaining in the crafts with unusual completeness, thanks to the admirably kept and well-preserved accounts.

SIR CHRISTOPHER WREN

In a long series of thin folio volumes—vellum-paged and vellum-bound with the device of the cathedral, crossed swords under a D stamped on the cover—the monthly expenditure is written in a clear hand as legible now as the day it was penned. So faithfully is each step in the gigantic enterprise recorded in these pages, that he who has turned them over feels himself to have watched while

> " Out of the earth a fabric huge,
> Rose like an exhalation,"

till

> " Th' ascending pile stood fixt her stately highth."

The entries range from important contracts with quarry owners at Portland or Burford to the caps and cloaks of the five watchmen employed at 5*d.* *per noctem*, and the allowance of 15*s.* a month to Mr. Wm. Spencer for meat for the watch-dogs; from the payment to Andrew Niblett, coppersmith, for the ball and cross over the lantern to that to John Smallwell " for stuff and time in altering the bishop's throne to make room for his feet"; from the honorarium of fifty guineas to Richard Jennings, carpenter, " for his skill and extraordinary pains, care and diligence in the performance of the centreing of the Dome, and for the modells for the same," to the price of 200 lb. of swansdown for filling fifty cushions for the stalls.

No detail connected with the construction and its finishings is omitted. Nor are such matters as compensations to owners of ships freighted with materials for loss by storm or foe, window-tax payable in respect of the Clerk of Works' Office, or interest due to persons who had lent money for the building, passed over in silence.

From this mass of contemporary evidence, as from the observation of the executed work to-day, two greatnesses emerge with overwhelming effect: the greatness of the craftsmen who wrought each at his trade, and the greatness of the architect who inspired, controlled and co-ordinated their handiwork.

The materials are bought by the Commissioners, in most cases direct from the producer or importer, and appear in the accounts under the heading of "Provisions." Sometimes, however, they are supplied by the contractors, but in that case they usually appear as a separate item in the account, side by side with time, skill and labour. The Strong family, besides being master masons, were owners of the Burford quarries; and when Richard Phelps is paid £64 10*s.* for casting a large bell as per contract, there is a second item of £50 4*s.* 6*d.* for 7 tons 2 cwt. and 21 lb. of new metal.

The works were only partly carried out by contract. These were described in the Accounts as "Task work," and measured up periodically by the Commissioners' measurer for the purpose of ascertaining whether the work corresponded with the contracts entered into by them and recorded in the minutes of their monthly meetings. The remainder is "Day work," masters and men being paid by time, the former 3*s.* a day (equivalent to from 10*s.* to 12*s.* in pre-war value), and the men 2*s.* 6*d.* (equivalent to from 8*s.* to 10*s.*). The masters' time was doubtless spent rather in supervision than in manual work. But the spirit and excellence noticeable in the craftsmanship, whether structural or decorative, resulted in no small degree from the fact that the contractors were themselves craftsmen, and not mere organisers of labour and supplies.

Of the fabric which resulted from the joint labours

Grinling Gibbons (1648–1721). A Mezzotint by J. Smith from a Painting by G. Kneller. (R.I.B.A. Collection.)

of all it may be said that structurally speaking it is a monument of sound workmanship. The one branch in which some unsoundness has manifested itself is the masonry. In so far as failure here is due to the builders and not to external agencies, it must be attributed rather to lack of experience than to inferior work. No building comparable in dimensions or weight had been erected for many generations, and it was inevitable in an experimental feat of this nature that both craftsmen and architect should be liable to errors of judgment from which the mediæval cathedral builders were not exempt.

When we turn to the decorative crafts we know not which more to admire, the verve and accomplishment of the artists or the genius of the architect. It is clear that Wren exercised control over the works down to the minutest details. For instance, in checking the accounts of Nicholas Alexander and Nathaniel Turner for the furnishing and upholstery he "abated" them by £14 3*s.* 8*d.* and £9 8*s.* 11½*d.* respectively, though eventually the Commissioners paid them in full.

To what extent he supplied designs for the decorative stone, wood and metal work must remain doubtful. Few, at any rate, of such drawings are extant, and when a contractor agrees, as did Tijou in 1691, to carry out work "according to the pattern approved," it is uncertain whether this was supplied by himself or by the architect. Probably it would be sufficient for Wren to specify that a panel was to be of "grotesk (=arabesque) work," a moulding cut with "raffled leaves" (=acanthus with the tips turned over), a space adorned with festoons, palms, and wreaths of flowers, a frieze with "caparole" (=wave pattern or "Vitruvian scroll"), a cartouche to be of leather work. The carver, the modeller, the smith knew the general character of what was wanted, and each

would interpret it according to his own taste. Usually, however, models or cartoons were prepared by the masters for the guidance of the men. Thus in 1695 Charles Hopson, joiner, is paid for models for the outside of the east end, the altar, the organ-case, etc., and for boards for Jean Tijou, smith, and Grinling Gibbons, carver, to draw upon.

In view of this method of procedure wonder increases at the extraordinary unity which reigns throughout the ornamental portions, not merely of St. Paul's, but of all Wren's works. Not only is there an extraordinary prevalence of accomplished technique, but a most remarkable unanimity of style. Diversities of technique, and to some extent in style, there are, but they are insignificant compared with the agreement.

Now at the outset of Wren's career all arts had been depressed by a generation of political turmoil. There was no vernacular style in general acceptance, and the advanced Renaissance manner of Inigo Jones was still struggling for mastery over the semi-Gothic manner of the Jacobeans.

It would, however, be too much to say that there was no school of decorative craftsmen. Some of the crafts—and particularly perhaps that of the mason sculptors, which has left in our churches a great heritage of monuments and mural tablets—manifested a certain vigour and some aptitude for architectural proportion and well-carved and interesting detail. But English work as a whole bore a character of indecision and provincialism and fell below the standard of France or Italy.

How then did Wren secure so much homogeneity of style and so high a level of technique? He was helped stylistically by the fine decorative vernacular already established in the France of Louis XIV, where

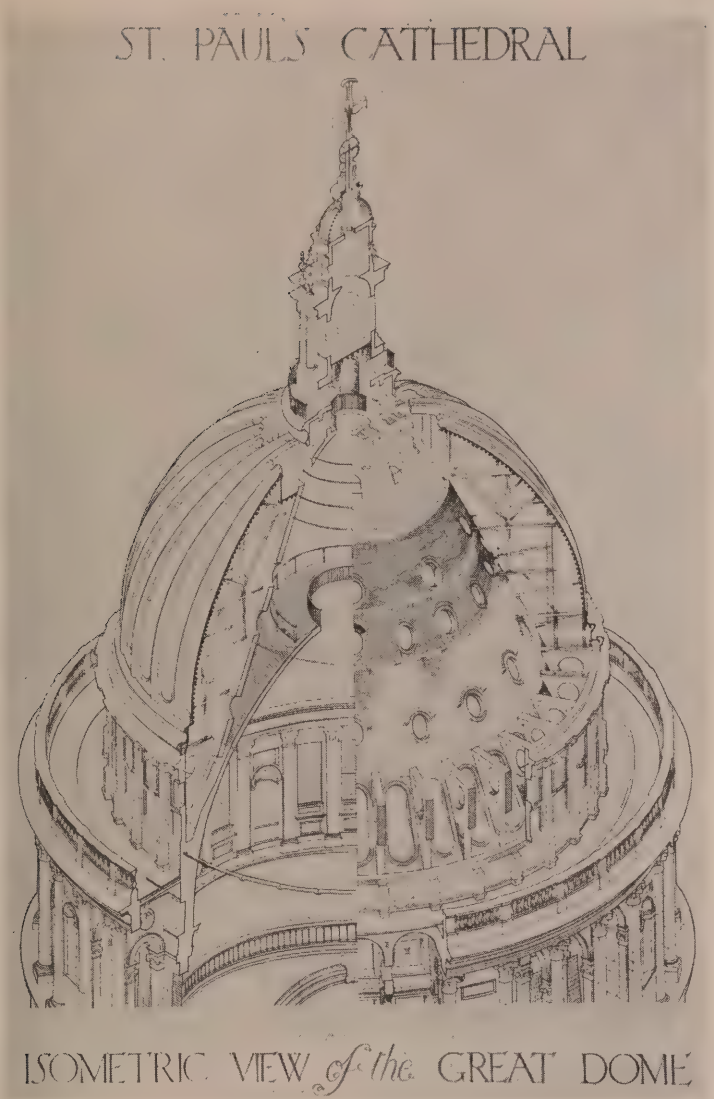


Fig. 1. The Construction of the Dome. From a Drawing by Wm. Dunn, F.R.I.B.A.

he had collected engraved designs, and as regards execution by a limited number of trained foreign artists. With these allies he took in hand the good native material —with a keen eye for the choice of the right men—and gave it the purpose and direction it lacked. That he provided them with sketches and ideas, corrected the contractors' models and draughts, and generally trained his craftsmen, there can be no doubt. He himself gives us an inkling of his methods in his letter addressed to the Master of Trinity at Cambridge in reference to the building of the new library. "I suppose you haue good masons; how ever I would willingly take a farther paines to giue all the mouldings in great; wee are scrupulous in small matters and you must pardon us: the Architects are as great pedants as the Criticks or Heralds. . . . I shall copy out partes of them (*i. e.* the designs) for the use of the workmen."

The results of such inspiration and control can be seen in the work of the two greatest of his master craftsmen. A comparison of Jean Tijou's published designs with his executed work reveals in the latter an architectural quality in which the former are sometimes deficient. With Grinling Gibbons it would seem that it was under Wren's guidance that the mere brilliant executant discovered by Evelyn reproducing pictorial effects in *trompe-l'œil* carving developed into the consummate decorator with style in his every touch.

In a word, to those who will listen to sermons in stones the great Cathedral proclaims not merely the greatness of the master-builder's mind by the bigness and breadth of its conception, but the enthusiasm with which the agents of the building were inspired by personal contact with him in the fitness and directness essential to sound architecture in each of its parts.

From general considerations we may now pass to more detailed notes on the several trades grouped under the headings of the materials they worked in.

STONE, BRICK AND MARBLE

The first contracts for masonry were given to Joshua Marshall and Thomas Strong, and the portions carried out by them up to July 1675 are clearly stated in the accounts. "To Joshua Marshall for Task of Masons Work by him done in the ffoundation of the South side of the Quire of the Cathedral Church of St. Paul in London (viz$^{t.}$) from the midle of the first Window Eastwards to the ffoundations of the Dome, including the South East Peer of the Same from the bottom of the ffoundation to the upper part of the plinth course, including Butterisses, Pillars and holes filled up in the ground before the laying of the ffoundation walls att ffourteen shillings and six pence the rod according to Contract." Thomas Strong charges for work "from the midle of the most Easterly Window of the South Isle and alonng the East End to the midle of the half Circle," or apse. The dividing line between the portion assigned to a particular mason was always from the centre of one door or window to the centre of another.

One great difficulty that Wren had to meet was that of procuring sufficient building stone. A huge quantity of stone was to hand from the demolished Cathedral. Workmen had been pulling down the old building, sorting out stone and carting away rubbish for several years before the new Cathedral was begun. This material could not be wasted, yet it was not the sort of stone that should have been used to form the core of an ashlar-faced wall. The ashlar faces, being built of solid

stones set together with thin mortar joints, left but little margin for settlement, whereas the core, being formed of rough fragmentary stones, had to be set in a mass of mortar. The centre of the wall, therefore, settled more than the ashlar faces, which were consequently left to bear the bulk of the weight. Long before the Cathedral was finished alarming cracks appeared in the surfaces, and large pieces of stone were flushed off in consequence of the enormous and unequal pressure which came upon the facings. The same method of building had been used by the Normans when they constructed walls of fortress-like thickness, with similar disastrous result.

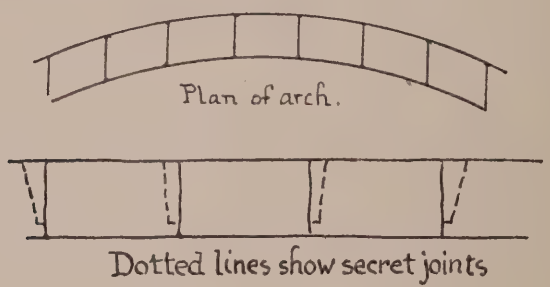
Nearly the whole of the outside of the Cathedral is built of Portland stone, which in clear sunlight shines out like marble. This extreme whiteness is produced by decay. Where the stone is black with soot it is sound, and the soot should never be cleaned off, since it is a protection from storm and frost.

Evidence of the way in which rain washes away the stone, when once the hard quarry-water face has gone, can be seen on the roof during a shower. The first water that pours down the lead gutters is for a moment or two milk-white, being charged with particles of stone.

The niches in the peristyle of the Dome are of Ketton stone, which appears to have weathered well. The difference in colour between it and the Portland stone must have been very marked when the work was done, and a contrast is still clearly discernible.

Inside the building many kinds of stone are to be found. Paynton stone from Burford was floated down the Thames. The stone brought from Beer in Devonshire, from Portland, and from Caen in Normandy,

came by sea, and the Kentish Rag from Maidstone by the Medway. That, however, from the Reigate quarries must have come by road, a distance of some twenty miles, since the nearest river, the Mole, is not navigable above Leatherhead. The Kentish Rag was used in some of the newel staircases, and Beer stone, apparently, for some of the carving in the interior; certainly the repairs to broken volutes in the large capitals on the "legs of the Dome" and in the transepts were done in the last-named stone.



Certain peculiarities of practice occur in the masons' work. For instance, in constructing the main arches under the Dome the joints—on plan—are made parallel to each other, and do not radiate from the centre of the Dome space. On the other hand, they understood and practised the method of building a lintel with secret radial joints and visible vertical joints.

When the drum of the Dome was being built the scaffolding was placed on the walls of the church so far as they were constructed, and the masons continued to build round the poles, some of which have been found imbedded in the masonry.

The joints on the top surface of the stone walls were masoned to form a ridge so that the water should

not stand there and so percolate into the joint, and these joints are further protected by being run with lead.

For this virgin lead must have been used, for old lead would not flow sufficiently freely to enter the narrow crevices of the masonry, since it becomes less fluid each time it is melted. This process of grouting, as it is now termed, is apparently what is described in the accounts as "yoating," *e.g.*:

"Apr. 1710. Edward Strong Masoning, &c. 499 ft. new stone and yoating same with lead and iron."

The same method of masoning is followed in Continental marble slab roofs; for example, at the Duomo of Milan, St. Mark's at Venice, and the Abbey Church at Alcobaça in Portugal.

There are at least seven rings of iron in the brick and stone cove of the Dome (Fig. 1). The strongest of these is placed at the bottom of the attic Order just above the level of the stone gallery. It is composed of eight iron bars one inch square ⊞ in lengths of about eight feet. These are welded together at each end and bent to form a hook, which is connected to the next length by an iron ring, the interstices being filled with lead. Higher up some of the chains are made of four bars one inch square welded together at the ends, which are formed into hooks fitting into each other.

At the fag-end of the accounts—in 1716—come two entries of payments to Wm. Thompson for 98 tons of "Guernsey pibbles" at 14*s.* a ton, doubtless for paving the space round the Cathedral.

The bricklayers' share in the fabric, if less in evidence than that of the masons, should not be overlooked. Their tasks included one item of immense importance, the building of the great cone—between the inner and outer domes—to carry the lantern (Fig. 1) and the humbler ones of laying tile paving over the aisle vaults, and the temporary brick floor which preceded the marble floor of the church itself, and of levelling for the latter. The master bricklayer was Richard Billinghurst.

One of the latest finishing touches to the great church was the marble flooring, which was generally carried out by the mason contractors, and the materials, including much Irish black marble, were purchased from time to time from Mr. Thompson.

The choir was paved as early as 1696. In September 1707 Samuel Fulkes, who had built the N.W. angle of the church, received various payments for "circular" paving in the windows and "streight" borders under the "sofitas" of the arches, for the "Arras" paving in the body of the church from the dome to the W. end and for the "Swedes" and black marble paving in the N.W. tower. "Arras paving" is evidently the name given to plain chequer-work. The Swedish marble was red or pink. The paving of the tower room has recently been taken up in the course of fitting it up as the Kitchener Memorial Chapel, but two of the red slabs have been re-used in the platform in the great western steps.

In October 1707 Edward Strong has a total payment of £1205 9*s.* 9*d.* for the paving of the area under the dome and its arches, for liming, rubbing, stopping, sawing, squaring, and laying various marbles in plaster and rubble-work. These include grey or dove-coloured Devonshire marble to be seen combined with black in

the hexagon borders, and "yellow Rantz" (from the French *marbre rance*), really a mottled red, used in the central star pattern.

Other items of marble work are the architrave entablature and casing of the great W. door—hence often spoken of as "the marble door"—which are in white marble now all but indistinguishable from Portland stone, and the marble column originally under the organ, now supporting the canopy inside the N. transept door.

Wren had intended further use of rare marbles for the adornment of the interior, but considerations of expense intervened, and he was constrained to put up with substitutes. Stephen Wren in the "Parentalia" (p. 292) implies that the E. end was to have been lined with them, and speaks of a "magnificent design of an Altar consisting of four Pillars wreathed, of the richest Greek marbles, for which the respective Drawings and a model were prepared." The dream was to be realised only in our own day. But Wren for the most part was content with carving for the decoration of the walls.

A great deal of the stone carving came into the masons' contracts. For instance, in 1692–3 Edward Strong is paid for mason's work round the apse, ornaments in the heads of three windows with drapery and palms at £13 each, and for three keystones in the upper windows; also for those on the E. wall each side of the apse. In September 1696 Nathaniel Rawlins and Edward Strong are each paid £142 18*s*. 8*d*. for half a freestone wreath in the N. transept vaulting with the ornaments of the "revailed" (*i.e.* sunk) pilasters at the sides of the great N. window, inside and out; and Christopher Kempster and Ephraim Beauchamp for carving the E. side of the S. transept window.

Let us now examine the work of these men, or rather

of the carvers they employed. Fig. 2 shows the carved base out of which issue the large pilasters at the E. side of the S. transept window. Fig. 3 shows the corresponding base on the W. side. There is considerable difference in the quality and strength of the carving, as may be seen if the two photographs are compared. The carvers could not have been working side by side, or there would not have been so much difference in carrying out the same design. Therefore we may conclude that they were worked in different workshops before the stones were fixed. That on the E. side is by far the better. It shows a vigour of line and breadth of surface not to be found in the one opposite to it.

Under the same window there is evidence that some modification had to be made after the first pieces of the "raffled leaf" moulding had been carved (Fig. 4). It is clear that this was started simultaneously by two carvers, for about four feet of the smaller detail on the right of the photograph occurs on either side of the centre of the window where the two contrasts met. This was evidently considered to be too small in scale, and was simplified and broadened so as to be effective when viewed from the church floor. The leafage on the left of the photograph is of the type followed in the rest.

Grinling Gibbons must have exercised a great influence on his fellow-carvers after he came—about 1694—on the building, where he executed much carving in stone as well as wood.

This influence is particularly noticeable in the enrichments of the spandrels of the niches in the piers. Fig. 5 is taken from one in the S. choir aisle and is an example of the first carving done. It shows the kind of ornament in use before Gibbons influenced public

Fig. 2. Pilaster Base. E. side of S. Transept Window.

Fig. 3. Pilaster Base. W. side of S. Transept Window.

taste, and is of a quality to be seen in many buildings of the mid-seventeenth century. The flowers are tightly bunched together, so that the form of the "boasted" stone is kept. On the other hand, the example shown in Fig. 6—from the S. nave aisle—has all the characteristics of work done by Gibbons, which depends on strong contrast of light and shade and on openness and lightness in execution for its effect, and not upon architectural forms. It may be questioned, indeed, whether his experiences in wood did not lead him to overpass the limits imposed by the nature of stone.

Among the entries in the accounts referring to carving the following item is interesting. June 1694. "Grinling Gibbons, for carving the several ornaments of the four Spandrels in the legs of the greater dome, at £32 each spandrel, by agreement, £128." All four spandrels are masterly in execution and design. Fig. 7 shows that of the N.E. spandrel. The Gothic wooden shield bearing the arms of the Goldsmiths' Company is a modern addition. In order to procure this photograph it was necessary to stand above the level at which the work is intended to be seen, and consequently it does not make the full effect it should.

Gibbons was masterly in the way in which he got breadth of effect in flowers and fruit. Before him carvers made them appear as a series of balls tied together like a string of onions. Under his skilful hand the objects are simplified and flattened, massed together and grouped into definite planes, and yet with consummate craftsmanship each leaf and flower is made to stand out distinct and graceful.

Gibbons' carvings under the choir windows on the outside of the church must have been a revelation in technique and design to the carvers of his day. The

entry for this work is dated June 1694. "For carving his several ornaments of eight festoons under the windows at the E. end on the outside of the church at £13 each: £104." Again, May 1695: "for carving the ornaments of seven festoons under the windows on the outside of the church at £13 each: £91."

Gibbons does not seem to have worked on the Cathedral for more than three or four years. He was perhaps too busy elsewhere. But his influence on the style was permanent, and subsequent work, both in stone and wood, continues to bear evidence to it.

Jonathan Maine, who appears to have been a disciple of his, and, like him, is better known for his work in wood, in 1701 carved the "revailed" pilasters in the N. Library and the large scrolls they carry; in 1703 the great moulding at the foot of the pilasters in the Dome with "raffled leaves, shells," etc., and "lace" in the upper member; and two years later the very beautiful band of ornament over the niches mentioned above (Fig. 6), which runs round the whole interior of the Cathedral. He was paid £189 9*s.* for carving 681 ft. run of it with "caparole and flowers, husks and leaves, etc., 8 in. high and 1¼ in. "imbost," "beginning at the N.E. leg of the Dome and so continuing round the church (except the N.W. quarter) to the jamb of the S.W. great stairs at 6*s.* per foot running."

It is not generally realised that Gibbons was a statuary as well as a carver. But he appears not to have cared for this side of his art, and may often have delegated it to others. The work he did in the bas-relief over the N. Portico, comprising angels, the King's arms and crown, and the Lion and Unicorn, for which he was paid £120, does not come up to the standard of his foliage carving.

Fig. 4. Enrichments under South Transept Window.

He was not, however, the only sculptor of note employed on the building. Two others are found working there. The Holsteiner, Caius Gabriel Cibber, the father of Colley Cibber the laureate, was paid £280 early in 1698 for carving eight great keystones in the arches round the Dome space, "7 ft. high, 5 ft. broad and 18 in. imbost, wrought after the stones were set." This is one of several mentions of carving done after fixing. The reason for it in this case is, that the keystones are built up of several stones.*

In the summer of the following year Cibber was paid for decorating the great stone piers of the gates to the steps of the S. Portico.

"For masoning and carving 4 incense pots upon the piers of the S. Ascent at £30: £120; and 4 double festoons and 8 cherubims on the pedestals: £52."

He also received £122 for the phœnix over the S. Portico. At the same period he was also carrying out similar works at Hampton Court.

By the time the W. end was reached another sculptor comes on the scene in Francis Bird. In 1706 he is paid £300 for carving "the large Pannel in Bass Relivo over the Marble Dore at the W. End, 16 foot broad and 14 foot high, and the principal figures 18 ins. imbost, the others about 9 ins., the whole upon a supte girt is about 406 foot, and it likewise contains 9 large Figures about 8 foot high each and one small Figure, with a large Italian molding round the same." This group represents the preaching of St. Paul. Three masons were paid three days each "to cut holes for Mr. Bird to carve."

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* Similarly on 10th December 1708 a contract was made for fluting and cleaning the columns in the W. Portico, which were already in position.

He also carved the other panels in the Portico and the group in the great Western "Pedament representing the Conversion of St. Paul." It is not easy to realise from below the size of these figures, several of which are on horseback, some projecting 2½ feet. The pediment itself is 64 ft. long and 17 ft. high. The sculptor received £650 for this work in December 1706.

Bird further carried out most if not all of the figures above the main entablature of the W. front (Fig. 8). These are about 12 ft. high and had to be built up of many stones, secured together unfortunately with iron cramps, for most of which bronze has now been substituted. He also made models for the pine-apple on the S.W. Tower, and for the scrolls, ball and cross on the lantern of the Dome.

Finally, he executed the Queen's statue—now replaced by an inferior copy by Belt—in front of the church, with its pedestal and all its adjuncts, at a total cost of some £1700.

WOOD

A constant feature in the accounts consists of "day-work" payments to carpenters. But these concern principally works of a temporary character, such as the putting up and taking down of scaffolding, bridging, centring, shedding and railings for the accommodation of the other trades and the protection of the building. The chief permanent work lies in the roofs, which were done by contract.

The master carpenter for the bulk of the work was Richard Jennings, who carried out the greater part of the roofs. As the end of the work was approached, another, John Longland, comes on the scene. In September

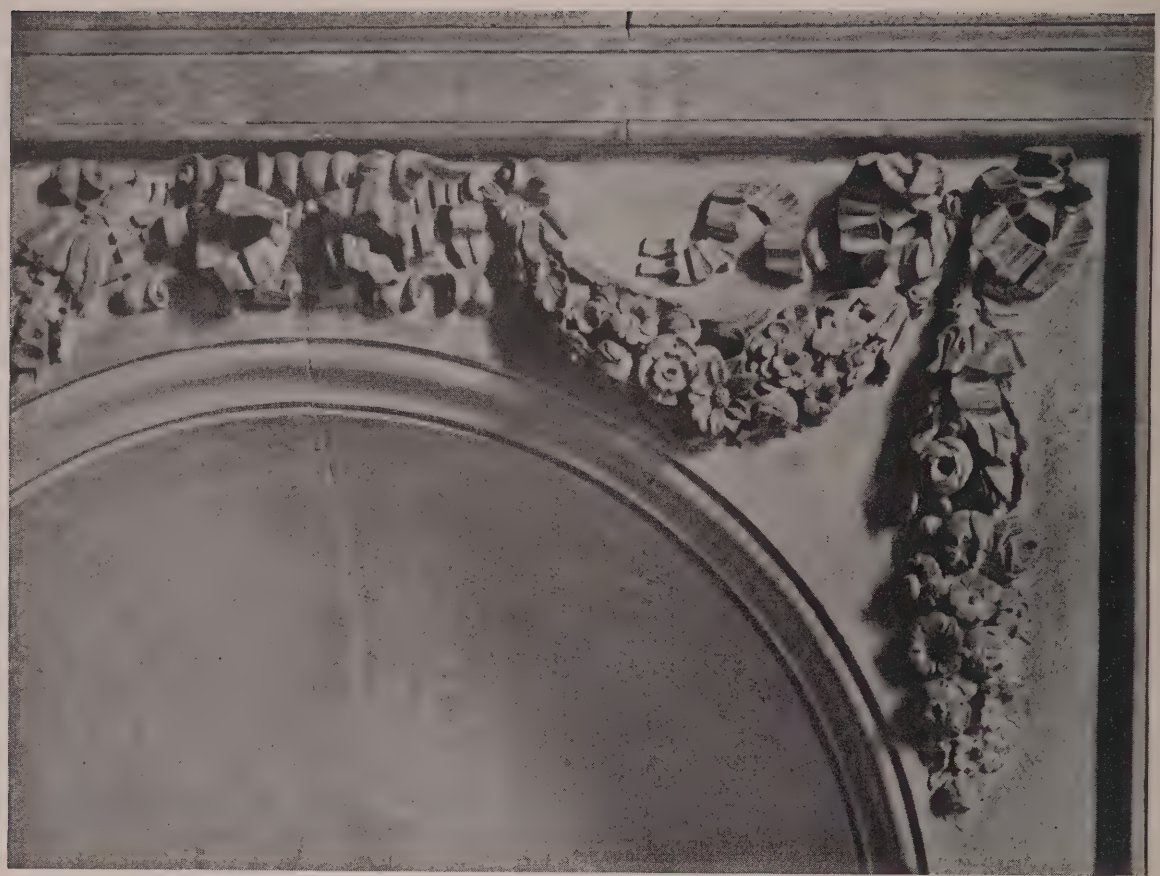

Fig. 5. Niche Head in S. Choir Aisle.

Fig. 6. Niche Head in S. Nave Aisle.

1701 he was paid for the roof over the N. Library, and in July 1703 for eleven new bays of the nave roof and for the roof over the S. Library, while the roofs at the W. end were the joint work of the two masters. In April 1706 they were paid for framing, raising, and boarding the great roof of "the middle isle from the E. end of the W. Dome to the W. Pedament, with putting on the Ironwork to the Trusses and completing the said roof fit for the Plumbers."

The joiners' day-work consists mainly in the making and repairing of moulds, levels, rules and squares for their own and other trades. The task-work includes the fittings of the choir, vestries, western chapels and library, as well as models for parts of the building and for its fittings, some of which are still in existence.

The great scale model for Wren's Favorite Design dates, of course, from a period anterior to the accounts of the present building. It cost all told some £600 (equivalent to £1800 or £2000 in pre-war values), a sum not surprising, when the elaboration of the work is considered and its completeness in every detail of carving, plaster-work and gilding.

After an exile of some years at S. Kensington this model returned—not undamaged—to the Cathedral and reposes in the N. Gallery, where the deplorable results of neglect and mishandling may be observed. Is it too much to hope that when the more urgent needs of the fabric itself are met, the authorities of the Cathedral will turn their attention to the repair and preservation of this monument of craftsmanship which preceded it, and is so valuable as a historical relic, and that generous patrons will be found to finance the undertaking? When this happy day arrives a more suitable position, and more accessible to students, might be found for this and the

other models than the dimly-lit lumber-rooms they now occupy.

It is to be noted in connection with the materials used by the wood-workers that the fittings of the choir and vestries appear to be made from imported wood. Yet we know that a huge amount of English-grown oak was sent to the building, including timber given by the Duke of Newcastle from his estates and brought by sea. This must have been used for constructional work.

Fig. 9 shows the roof-timbers over the choir. The tie-beams here are 14 in. × 12 in., and 45 ft. long. There are twenty of them in this part of the roof alone. If the roofs of the nave, transepts, aisles and Dome are added, it will be realised what a stupendous quantity of oak was used up in the building. No doubt the joiners preferred, as they do to this day, to use foreign oak, which is so much easier to work and, being of straighter grain, less liable to twist.

Woods other than oak were used only in the making of models and certain portions of the carved work in the choir. In September 1701 Smallwell receives £8 for "lime tree and glew" for a model for alterations to the winding stairs; and in December 1709 Hopson £5 7*s*. 6*d*. for "pair tree" for a model, and for turning balusters. Lime was also used by Gibbons for the cherubs' heads between the large scrolls above the stalls, the pendant wreaths between them, and the swags connecting the brackets in the frieze.

Gibbons introduced the practice of using lime for carvings to be applied to oak. The delicacy of his elaborate carving in high relief required a tougher and smoother-grained wood than oak, if the minuteness and delicacy of finish were to have full effect. In the carving at St. Paul's, however, it was not so much for fineness

Fig. 7. Wreath by Grinling Gibbons on Spandrel of N.E. Pier of Dome. (The Shield is modern.)

of finish as for contrast in colour between the whiteness of the lime and the warm brown of the oak, that the two woods were used. It was customary in Wren's time to stain oak with a reddish colouring matter, and on this to apply some kind of spirit varnish, and no panelling made of imported oak is to be found that is not so treated.

In September 1696 no less than £4555 17*s.* 7*d.* was paid to three firms of joiners for the fittings of the choir :—

Roger Davis and Hugh Webb	£1876 4*s.* 6½*d.*
John Smallwell	£1040 18*s.* 1½*d.*
Charles Hopson	£1638 14*s.* 11*d.*

All the items are priced. The following may be quoted as specimens :—

For swelling frieze with grotesque enrichment, girth 5 in., 144 ft. run, @ 5*s.*	£36 0 0
For great modillion cornice having six members enriched, girth 13 in., 156 ft. run, @ 10*s.*	£82 10 0
For two grotesque capitals @ £7. . .	£14 0 0

Hopson received further payments for work about the choir in 1697, for fitting up the Morning Prayer Chapel and Consistory Court (now the Chapel of St. Michael and St. George), for the outer doors of the church and for articles of furniture.

Among the last may be mentioned the Holy Table and the Consistory table. The former, now kept in the Crypt, is of normal height and only 7 ft. 6 in. long, though 5 ft. 1 in. wide. It is supported on two legs with handsome carved scroll-brackets. These rise from

moulded cross-stretchers resting on ball-feet. The cost was £14; but this sum cannot have included the carving.

The Consistory table, now in the vestibule of Lloyd's Bank, occupying the Chapter House, measures 11 ft. 6 in. by 8 ft. It cost £20 14*s*. Both have "Parkitine," *i.e.* parquet-work tops. This is the only work of the kind to be found in the Cathedral (except in floors), a rather curious fact in view of the effective use made by Wren of this form of decoration elsewhere, *e.g.* in altar-pieces and panelling.

At St. Paul's he depended entirely upon carving for his enrichment of wood-work. Of this there is abundance and of the finest quality.

It will have been noticed in connection with Charles Hopson's account quoted above that a certain amount of decorative carving was charged for in the joiners' task-work, as was the case with the masons. But by far the greater part was executed by special carvers, and particularly by the prince of wood-carvers, Grinling Gibbons, who of course had his own trained staff. Some of the items in his account for £1561 4*s*. 6*d*. for carving paid in 1697 may be of interest.

Within the choir:—

2 large "cartoozes" (*cartouches*) under the choir organ at 40*s*.	£4	0	0
2 large terms at £15	£30	0	0
The drapery and whole boys and two half boys	£25	0	0
60 cherubs' heads in the parapet at 22*s*.	£66	0	0
62 scrolls half of leather-work in do. at 22*s*. 6*d*.	£68	15	0
42 "cherubins" terms at £5	£210	0	0

Fig. 8. Steeple of S.W. Tower. Built by Wm. Kempster ; Figures by Francis Bird.

On the "back-fronts" of the stalls :—

32 palms and garlands at 30*s*. . . . £48 0 0

(see Fig. 11).

About the organ :—

6 festoons in lime-tree £12 0 0
4 "grotesk" scrolls in wainscot . . £6 0 0

Fig. 10 clearly proves how thorough was the work of the wood-carver. In the right-hand capital one half of the spiral volute has been broken off and exposes the inside of the other half, and there even in this undercutting the volute has been completed and well finished. In Fig. 11 the flat wreaths on the back of the choir stalls illustrate Gibbons' method of carving better than does his more elaborate work. Each flower is kept flat and broad with a crisp outline, and there is a secondary plane in which the flowers appear in half-tone. The same breadth is also preserved in the carved mouldings. The section of the moulding is adhered to on the face of the carving with only sufficient modelling on the surface of the leaves to give the necessary feeling of growth. This not only produces a sense of repose, but makes the pattern of the outline of the enrichment tell far better than if the surface were elaborately modelled.

One is filled with wonder in contemplating the work of this master of his craft at the way he contrived to wed convention with naturalism. It is impossible to imagine anything closer to nature than his poppies, his tulips, his crane's-bills, and yet through all breathes the impalpable feeling for style which turns them into admirable architectural decoration. If anyone wishes to appreciate the pitiful effect for such a purpose of

naturalism without style he has only to compare Gibbons' work with that carried out under Ruskin's auspices on the Museum at Oxford.

The mention of boys' and cherubs' heads recalls Gibbons' powers as a figure sculptor. Many of the heads have great charm, and the boy terms, if scarcely suggesting sufficient rigidity for the architectural purpose they fulfil, have at any rate real baby bodies and are not the muscular athletes on a reduced scale which decorative *putti* often become.

The most important wood-carving outside the choir is the work of Jonathan Maine, whom we have already met as a stone-carver. As early as 1696 he was doing work in the Lord Mayor's and Dean's vestries, and in 1698 in the Morning Prayer Chapel. In June 1706 he is paid a detailed account for his work in the Consistory Court, among the items being

2 large shields with "Cherubins'" heads and drapery hanging from them £48 0 0

and

4 vases on the "pedaments" . . . £4 0 0

In July 1709 he had finished the work in the South Library, and was paid £16 10*s.* a-piece for carving 32 trusses or "cantalivers" under the gallery, 3 ft. 8 in. long, 3 ft. 8 in. deep, and 7 in. thick, "with leather-work cut through, and a leaf and a drop hanging down with fruit and flowers," and other items making a total of £243 8*s.* 7¼*d.* (Fig. 12). Accomplished as his work is, it does not rival that of Gibbons in delicacy of execution or fancy.

Fig. 9. Roof over Choir, framed by Richard Jennings. (St. Paul's Cathedral.)

IRON, LEAD, COPPER, BRASS

Much iron is used throughout the building for structural purposes, such as the chains in the Dome, the cramps in the masonry, and the straps in the roof trusses, which have been already mentioned. This, however, calls for no further notice except to express a regret that Wren's age had not yet realised the dangers to which stone-work is exposed by the expansion of this metal due to corrosion.

The interest from the artistic point of view centres upon the decorative smith's work, and particularly that of that great master craftsman, Jean Tijou, a Frenchman who had settled in England young and set up his work-shop at Hampton Court. His work at St. Paul's covers almost the whole of the decorative iron-work, among the rare exceptions being apparently the beautiful lock-plates which are chased in the form of the Cathedral's device of crossed swords under a D.

Tijou first appears in the accounts in 1694–5, as receiving payment of £442 for an iron screen under the organ, and onwards up to 1711–12, when he is paid £385 13*s.* 9*d.* for the iron fence round Queen Anne's statue in the W. area.

The small iron grilles to the doors of the verger's office at the back of the stalls (Figs. 13 and 14), and to light the staircase to the seats above the stalls (see Fig. 11), exhibit a delightful balance between sturdy constructional smith's work and foliated enrichment.

Tijou also executed the balustrade of the geometrical stair in the S.W. tower and the elaborate iron-work about the foot of it. This is a fine imaginative piece of composition in which architecture, stone-carving and metal-work all bear their part in the result (Fig. 15).

In September 1698 he is paid for two great gates on the N. and S. sides at the E. end of the choir, of which the "overthrow" is shown in Fig. 16. Note the ingenious introduction of candle sconces for the lighting of the Sanctuary, forming a kind of cresting.

The great size of the window opening necessitated unusually strong stanchions to resist the wind pressure. The method (see Fig. 17) is unique, and suggests Wren's authorship by its combination of scientific efficiency with artistic treatment. It is described in the contract as "munnions of openwork and groteske," and the playful scroll bracket at the top is mentioned in the accounts.

Of the lead-work the main part is the covering of the roofs and Dome, the weight of which must be enormous. All the sheets of lead are cast to a weight of 20 lb. to the square foot, that is to say, nearly three times as heavy as the lead in common use for church work in modern times.

The sheets of lead, which are from 18 to 20 ft. long, are not dressed over wooden rolls in the modern manner, but jointed with welts, that is to say, the lateral edges of each pair of sheets are curled over one another to form a hollow roll.

The water from the roof is conducted to the ground by large square lead pipes placed in well-holes in the thickness of the walls, so that nothing shows outside.

The plumbers' accounts contain frequent payments for making lead cisterns. Several such, beautifully enriched with cast ornament and panelling, and bearing their dates, similar to those common in London houses of the period, are preserved in the S. gallery.

In the category of copper and brass are several interesting entries. In November 1707 Jane Brewer, coppersmith, is paid "for work done by her at St.

Fig. 10. Capitals on S. Outer Face of Stalls.

Fig. 11. Door-head in S. Outer Face of Stalls. Wreaths by Grinling Gibbons; Grille by J. Tijou.

Fig. 12. Oak Truss in Library. By Jonathan Maine.

Fig. 13. Grille in Door of Verger's Office. By Jean Tijou.

Fig. 14. Grille in Door to Verger's Office. By Jean Tijou.

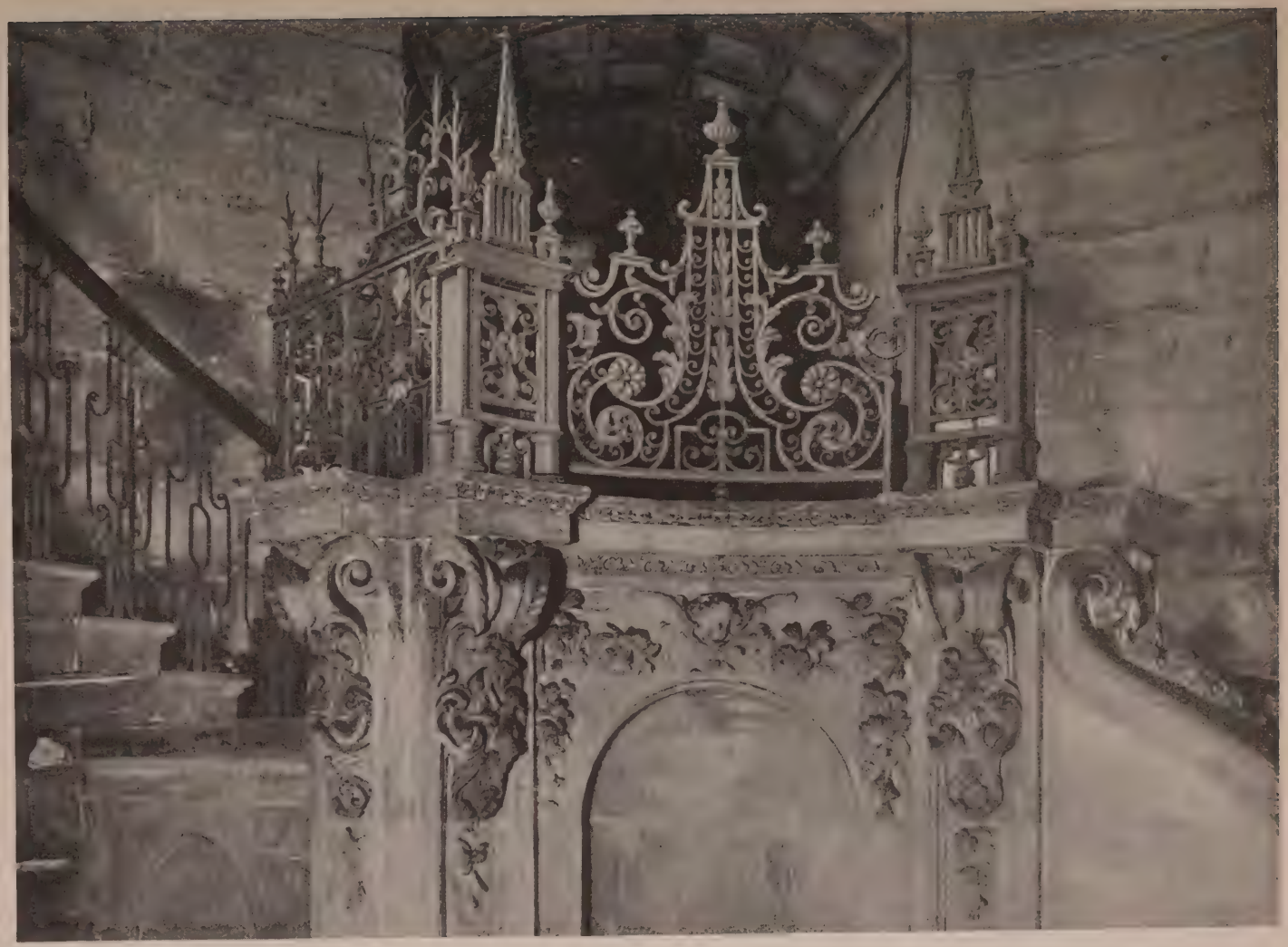

Fig. 15. The Dean's Entrance in "Geometrical Stair," S.W. Tower. (St. Paul's Cathedral.)

Fig. 16. Overthrow of Gate, S. of Sanctuary. By Jean Tijou.

St. Paul's Cathedral London
Detail of Railing round Whispering gallery of Dome
141 A
(Sketched on the spot, in 1870, by Robert William Billings
Architect; and after the decease of his Widow, in 1884
given to J. Drayton Wyatt.)

St. Paul's Cathedral. Detail of Railing round the "Whispering Gallery" of Dome. From a Sketch by R. W. Billings. (R.I.B.A. Collection.)

James', being the copper-work of the S.W. Tower," for 9 tons 1 cwt. 19 lb. of copper and brass, with the workmanship in four large " scrowls " and leaves 4 ft. high and 15 in. on the face at 3*s.* per ft. : £158 5*s.* For 8 tons 2 cwt. 27 lb. of copper with workmanship in the body of the " scroles " and plinth, with neck and pine upon it, and all the ornament, at 4*s.* per lb. £195 16*s.*

In 1708 Andrew Niblett, coppersmith, is paid for the ball, cross and ornaments of the main lantern £1538 1*s.* 6*d.* at the rate of 3*s.* 6*d.* per lb. for 8789 lb. In 1709 he was paid for five brass plates " planished and polished for [the pavement under] the Dome weighing together 5 tons 3 cwt. 3 lb., at 3*s.* per lb., £97 1*s.* 9*d.*" These plates were introduced apparently for the ventilation of the Crypt. The pattern formed by the perforations is emphasised by incised lines now much obliterated. The charge for drilling and filing 2064 holes at 12*d.* each is £103 4*s.*, and the engraver's fee for graving the lines £7 12*s.* 3*d.* In 1709 Niblett supplies candlesticks for the choir, 76 at 2*s.*, 16 at 2*s.* 3*d.*, and 6 for the iron desks at 2*s.* 6*d.*

Langley Bradley is paid in November 1707, £243 15*s.* 6*d.* for two bells " for the clock to strike the quarters upon.

viz$^{t.}$ great bell	24 cwt. 2 qrs. 26 lb.
lesser bell	12 cwt. 2 qrs. 9 lb.
	37 cwt. 1 qr. 7 lb.

at 14*d.* per lb. averdupoize," in December 1708 for the " large quarter clock going 8 days," £300 ; and in 1712–13 for three copper hands for the clock, £5.

In 1716 another bell-founder, Richard Phelps, receives £123 for a large bell.

PLASTER, GLASS, COLOURS, STUFFS

There is a considerable amount of modelled plaster-work in the ceilings of the Cathedral, most of which was done by Henry Doogood, a plaster modeller of repute in his day. These enrichments are all made in lime plaster and modelled *in situ*.

An item of his work occurs in September 1696, when he is paid for 1164 ft. of "compass moulding" in the choir aisles with two "inrichments" made by hand, girth 16 in., at 2*s.* 8*d.* per foot run, twelve shields, 4 ft. in diameter, at 1*s.* 10*d.* each, sixteen spandrels of foliage at 4*s.* each, compartments with two festoons, the King's and Queen's cipher, etc., etc.

In September 1697 he is paid for general plastering and colouring on the N. side, fifteen mouldings made by hand with two enrichments and four spandrels of foliage; in August 1704 for 190 yds. of finishing with cockleshell lime in the S. Library at 2*s.* 6*d.*, £23 15*s.*

After 1707 his place is taken in the accounts by another plasterer, Chrysostom Wilkins.

Of the glazing there is little to be said. Though the art of stained or painted glass lingered on in Wren's day in a degraded form in distant provincial centres, it was extinct in and about London, and it is clear that Wren had no intention of introducing colour in that way into his work. All the glazing at St. Paul's was in clear glass. Very few quotations will suffice as specimens.

In April 1696 John Oliver supplies 48 plates of "christall" 2 ft. 1 in. by 1 ft. 6 in. for the sashes in the organ loft. In 1707 Matthew Jarmer receives £33 7*s.* 2¼*d.* for 1067 ft. 6 in. of glass in squares in five great windows below in the N. and S. "Crosses" (*i. e.* Transepts),

Fig. 17. Wrought Iron Window Frame. By Jean Tijou.

at 7½*d.* per foot; and 5*s.* 7*d.* for 16 ft. 9 in. of glass new leaded in three N. lower windows at 4*d.*

Coloured glass began to be put into the Cathedral in 1868, and with the exception of the late Mr. C. E. Kempe's admirable windows in the apse, and that put in by Micklethwaite in the Chapel of St. Michael and St. George, it could all be removed with advantage, since it obstructs needed light without redeeming beauty.

Colour, however, was applied to the interior in other ways—by means of painting and gilding. At the close of 1697 William Thompson was paid for painting "the circular part of the choir like marble, being first twice soaked in oil, then primed and painted with flake and veined at 4*d.* per yard: £192 10 0; gilding about the altar containing 39$^{m.}$ of double gold and 3$^{m.}$ of single gold upon extraordinary size at £4 per m.: £168;

Painting the glory	£3	0	0
„ „ foliage in the frieze . .	£30	0	0
„ „ 4 fluted pilasters lightened with ultramarine and veined with gold . .	£160	0	0
„ „ altar rails like marble .	£6	0	0"

and other items.

Marbling was, of course, a common form of decoration in the seventeenth century, often of pleasing effect and quite innocent of any purpose of deception. In this case, moreover, it was "intended only to serve the present occasion,"* till the Sanctuary could be made glorious with precious marbles.

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* "Parentalia," p. 292 (note).

Other touches of colour were introduced into the choir by the "japanning and gilding" of the reading-desk and the "japanning 38 boards [above the stalls] blew," and "drawing the titles of the prebends on them in gold." These survive with the opening words of a psalm under each name, indicating the place where the prebendary concerned began his daily duty of reciting five psalms, the whole book being thus recited every day, *e.g.* "*Nesden. Domine, ne in furore.*"

With the object rather of preservation than of decoration, the outer doors and the whole interior of the Cathedral received a coat of paint, which was only removed in recent years. Thus in December 1709 William Thompson is paid £597 0*s.* 10½*d.* for painting the nave and aisles with the western chapels "from the top of the Attick story to the Paving." Even the marble sculpture in the panels on the W. front was protected in the same way.

In the matter of internal decoration Wren was frustrated of the crowning glory which he had in view. On September 23, 1715, "Mr. Thornhill was paid in part for painting the cupola, £200," a sorry substitute for the "mosaick work as at St. Peter's" to be executed by "four of the most eminent artists in Italy." The unfamiliarity and the expense of this method of decoration caused its rejection.

There remains but one finishing touch to be recorded —that supplied by the mercer and upholsterer. A mention of a few items in their accounts will show that they contributed an element of richness and colour as well as of comfort to the choir and chapels.

In 1697 and 1698 the account of John Bernard, cabinet-maker, includes a sum of £8 8*s.* for "12 high fine Russia leather chairs, treble nailed and extraordinarily

Boxwood Carving of Sir Christopher Wren, by Grinling Gibbons. Originally in the Collection of the late James Wyatt, R.A. (1746–1813). (R.I.B.A. Collection.)

Boxwood Carving of Sir Christopher

well made up," and of £1 15*s.* for "1 great chair suitable stuffed with curled hair;" and that of Nathaniel Turner, mercer, items of purple cloth and purple silk fringe and crimson silk fringe for the Morning Prayer Chapel.

For the choir, Nicholas Alexander, mercer, receives £468 10*s.* for crimson cloth and gold fringe, and Richard Turner supplies :—

yds.	
58	rich flowered velvet,
157½	„ pile „
45¾	fine ingrain serge,
17	rich Genova damask,
4	„ flowered mantua;

all crimson. And Nathaniel Turner 12 yards fine holland damask and 19 yards napkinning and a fine long Persian carpet (price £14) for the Communion Table.

The foregoing remarks and quotations have given some idea of the variety and excellence of the crafts which collaborated in the building and beautification of Wren's masterpiece. To sum all up, it may be claimed that we see in St. Paul's a school of design and craftsmanship comparable in accomplishment—if diverse in scope—with that which was flourishing contemporaneously at Versailles; and the result of the collaboration of a number of talented craftsmen under the guidance of a master mind. This craftsmanship was not a new creation, but it received a new direction and inspiration, and thus acquired an architectural quality and stylistic unity very impressive to the craftsman of to-day. But in contemplating the work of the craftsmen at St. Paul's, where everything they touched reveals a profound

feeling for style and is admirably fitted for the place it was destined to adorn, he recognises in their achievement a proof of the healthy condition of the trades of that day and of the pleasure each man took in putting his best work into the fulfilment of his allotted task.

SIR CHRISTOPHER WREN'S PUBLIC BUILDINGS. *By A. E. Richardson, F.R.I.B.A., Professor of Architecture, University of London.*

AS Wren's public buildings are connected with historical events and commerce it is of importance to remember that England at the time of the Restoration was beginning to fear Dutch commercial rivalry. The ascendancy of the merchant class in Holland under De Witt, together with a memory of the insults the King had suffered from the Dutch during his exile, embittered the Court and secured the sympathy of English merchants to such an extent that the country was forced into war. Then came the Plague, followed a year later by the purifying flames which consumed the crowded ways from the Tower to the Strand.

For the time English commerce was ruined, public confidence was shaken, the administration of the defences of the country was in a deplorable state, and people began to compare the monarchy to the Commonwealth. England at last awakened to a sense of humiliation when the thunder of the Dutch guns reached London and the capital presented a mass of debris. The King, roused by such events from sauntering and dallying, hastened to the City to consult with the civic authorities, for

Charles the Second never showed at greater advantage than in times of emergency.

Wren aimed in his plan for rebuilding London at placing the public buildings on their old sites, in order to preserve local associations. He had original ideas regarding the administrative centre and proposed to group the halls of the City Companies about the Guildhall, as well as to construct a wide quay on the north bank of the river from the Tower to Blackfriars. The majority of those in a position to help the scheme, apparently through lack of vision, gave their weight to the theory of retaining the ancient streets and parish boundaries, the short-sighted policy of which is apparent in the congested state of the streets to-day.

After the Fire when the workers were busy Charles continued to saunter, apparently careless of the dominance of France, which at that period was the wealthiest of Powers. For the next thirteen years we are to follow the fortune of King and Country through plot and counterplot. Minister is to be succeeded by Minister, vain promise by non-fulfilment, until the death of Charles the Second in 1685 brought the public face to face with another form of repression. Through all the turmoil Wren continued to build and advise. Nothing appears to have daunted his courage. James the Second, despite his preference for Catholics, extended his patronage to Wren when he came to the throne, and even during the threat of Sedgemoor, the Bloody Assize and the second attempt at Catholic tyranny Wren's work in London and elsewhere went on unchecked. With the Revolution of 1688 came a fulfilment of the freedom worked for by those who had brought about the overthrow of Charles the First; the pendulum which had been trembling between Catholi-

cism and the Established Church now swung towards orthodoxy. The accession of William the First and Queen Mary brought increased patronage for Wren, who, in spite of the predilection of the Dutch King for barrack structures, as well as unceasing interference from those in the monarch's train who were eager to advise, continued to hold his appointment. The close of the seventeenth century found Wren and his followers in full possession of architectural interests in all that served to express contemporary social conditions. In spite of lengthy wars, political and religious dissension at home and in Ireland, as well as annoyance caused to the merchants by the ravages of French privateers which had damaged English shipping, the national wealth had been very great. By 1695 the Bank of England had been established and the credit of London merchants stood high. At this time many new public offices were erected, and, although not by Wren, contemporary engravings prove them to have been after his manner. Under Queen Anne the ascendancy of England as a maritime power was assured. The victories of Marlborough and Prince Eugene convinced Europe of the fallacy of the legend concerning the invincibility of the French army, and as a consequence commerce attained huge proportions. With the death of the Queen fortune appears to have deserted the veteran architect.

Wren's personality can be studied more closely in the facial aspect of his buildings. He was a draughtsman of consummate skill, and had the power, no matter whether he worked through the medium of domestic clerks to whom he could entrust drafting, or through the hand and brain of a master mason versed in the then familiar rendering of classic detail, of imparting a personal stamp to the work under his care. We are

prone to cavil at the unsuitability of the ornamentation and the weakness of the mouldings, but lose sight of the fact that little choice was left to the architect in those days for selection. Wren, we know, realised the fallacy of relying solely on illustrations, and we are aware that he attempted to remedy such deficiencies by despatching masons to Rome to obtain information at first hand. His power as an architect inheres in the fact that he was not only capable of designing a building to realise a given set of conditions, but he could frame the conditions and dictate them to a committee. In the case of Chelsea Hospital he not only designed the building but drew up the regulations for its working.

There is ample evidence to show that Wren was consulted soon after the Restoration to advise on the repair of historic buildings in the capital other than St. Paul's Cathedral, and to design new ones. This is important in any account of his public work, for it proves him to have been in preparation for the vaster works which after the Fire came to him in a never-ending stream.

Late in 1660 he was probably consulted by Bishop Juxon in connection with the roof of the Great Hall in Lambeth Palace. Then followed his appointment as deputy Surveyor-General under Denham.* At this time Wren appears to have acted as a member of a small commission for roads, streets and bridges. As deputy to Denham it fell to Wren's lot to report on the condition of the Tower of London and to undertake the repairs to the walls of the White Tower, to introduce new fenestration, and to replace the lead-covered turrets

* Sir John Denham (1615–69), Surveyor-General of Works, 1660. Dramatist and poet.

on the square towers at the angles with others of his own invention. Such works as the foregoing, together with the scouring of the Moat, which was left to the supervision of the Clerk of the Works, one Gammon, preceded the earliest essay of the architect in brick, namely, the Storehouse, a building designed on lines of the strictest economy and brought to completion in 1664. In this work Wren gives a foretaste of the power latent within him for endowing a simple structure with style. Nothing of similar character had been attempted hitherto in this country. Judging from contemporary drawings, the warehouses of the Merchants of London consisted of ramshackle buildings crowded in proximity to the riverside, the timber stages of which were piled one above the other without regard to convenience or security. Wren's Storehouse in the Tower, happily still standing, and interesting as a building erected prior to the Fire, reveals acquaintance with contemporary Dutch practice. It is rectangular in shape with projecting wings on one side; the main part is finished with a Mansard roof. The projecting wings, however, while in sympathy, are capped with roofs of a steep single pitch. The architect, in order to bring the pavilion roofs into harmony with the main body of the structure, had recourse to the ingenious device of hooded gables. The centre is marked by landing-stages for goods in three tiers, and finished by an impertinent little pediment, the only feature of inconsequence which mars an otherwise strong design. Reference to the inimitable Pepys indicates the impression made upon the diarist by the novelty of the building.

"Nov. 8th, 1664.—To dinner all of us to the Lieutenant's of the Tower; where a good dinner, but disturbed in the middle of it by the King's coming into

the Tower; and so we broke up and to him, and went up and down the storehouses and magazines; which are, with the addition of the new great storehouse, a noble sight."

Wren from the very beginning of his career as a designer was a master of technique regarding the selection and use of materials; this is clear from the dignity of this little-noticed building. The window openings are distinguished by reveals of gauged brick, and the main features brought into harmony by the coved cornice of wood, which is in excellent scale.

Nineteen years later Wren was commissioned to build the Grand Storehouse north of the White Tower, which was destroyed in the fire of 1841. Judging from contemporary views this was not the least of Wren's minor achievements. The façade as completed in 1692 to some extent recalled Dutch precedent. Old writers speak of it "as a noble building two hundred and forty-five feet in length and sixty feet in breadth." Begun when King James ascended the throne in 1685, it was completed to the level of the first floor. After the Revolution, William the Third decided to erect, as a first floor, the new or small armoury, in which, when finished, he and his queen dined in great form, having all the warrant workmen and labourers to attend them dressed in new aprons and white gloves. This time no expense was spared to make the building worthy of its position as part of the fortification.

The architect introduced stone dressings and embellished the chief entrance, which was on the north side, with coupled Doric columns, a triangular pediment, the Royal Arms, and carved military trophies in the style of Grinling Gibbons.

In the centre of the roof, rising high above the squat

Windsor Town Hall. From a Water Colour Drawing by Hanslip Fletcher.

Windsor Town Hall. From a Water Colo
Drawing by Hanslip Fletcher.

dormers, was an octagonal cupola. Such a building as this raised to please the military taste of William the Third had much in common with the designs illustrated in Vingboon's book;* but it can be conceded that a man of Wren's genius was never content with mere plagiarism. If he borrowed he certainly did not grudge paying interest for the accommodation. The pity is that full drawings of this unique building have not been preserved to demonstrate its intrinsic merit. In 1695 Wren was called upon to prepare apartments within the Tower for prisoners of the highest rank. There is apparently little authority for attributing the design of the Halls of the City Companies to Wren. Rumour associates his name with "Painter Stainers Hall," in Little Trinity Lane, Upper Thames Street, which was built in 1670, and also with "Plasterers Hall," that formerly stood in Addle Street.

It is of passing interest to note that Wren had something to do with the patching and repairs to Guildhall after the Fire, either in 1668 or a year later, at a cost of £2500. To the mediæval façade forming the Courtyard he added some curious detail over the pointed archway, consisting in the main of niches and bands of geometrical patterning, above which at the centre rose a tablet, carrying the Royal Arms, crowned by a segmental pediment, which feature as a whole was brought down to the horizontal by scroll forms on either side, much after the style of those flanking Temple Bar. When George Dance carried out his alterations in 1789, Wren's admixture of Gothic and Classic detail was swept away. While dealing with the subject of Sir

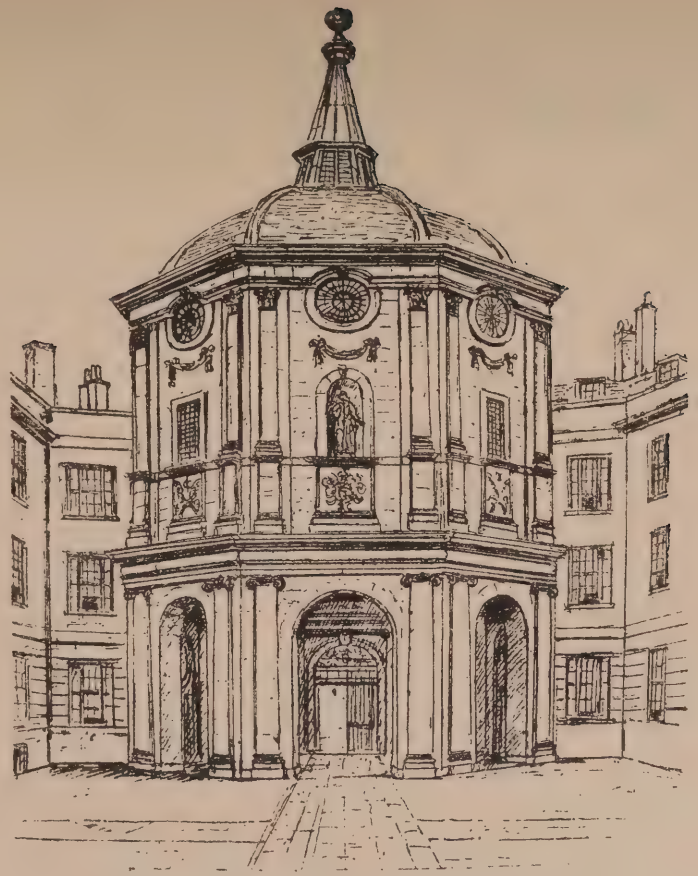
* Philip Vingboons: "Gronden en Afbeeldsels," etc., fol., Amsterdam, 1648.

Christopher Wren's early work in London, prior to and after the Great Fire, mention must be made of the premises he built for the Royal Society at the head of Crane Court, in Fleet Street. Externally this building carried the aspect of a private house of the period; it had the usual enriched doorway with attendant windows and a short flight of steps at the centre. Some old houses on the east side of this Court have been attributed to Wren; if they are not the work of the master, their designs pertain at least to craftsmen who were conversant with his manner. One house which may have formed part of the premises of the Royal Society has a room with a plaster ceiling of oval form. When the Royal Society met in Crane Court, liveried porters at the Fleet Street end advertised the fact; in addition, the rules of the Society included the lighting of lamps over the entry during each sitting.

The Chapter House, St. Paul's Churchyard, in like manner belongs to the category of Wren's public works. Its character is official and dignified. The admixture of brick and stone, the judicious use of gauged bricks to the window dressings, the moulded stone sills above the brick openings to the windows at each level, as well as the stone-work to the segmental doorheads, and the entire absence of ornament, mark it out as an example of dignity and restraint.

It was Wren's intention in his plan for the rebuilding of London to isolate the Customs House and make it a point for one of the streets radiating from the Royal Exchange, for he realised the importance of linking public buildings by means of main thoroughfares. The non-acceptance of his magnificent scheme meant designing an isolated building on the river bank which could only be seen in its entirety from the approach by water

The Monument to Commemorate the Great Fire of London (Sept. 2–6), 1666.



Lecture Theatre from Courtyard.

Main Entrance.

The College of Physicians, Warwick Lane, London (no longer existing). From pencil sketches made in 1828.

or on the Quay itself. The design consisted of an open courtyard plan having a lengthy centre and balancing wings. It was three stories high, the lower or basement story being arranged as a species of open colonnade, and the upper or order story holding one apartment at the centre and two floors for the wings. As an early example of the architect's manner it is interesting, for the influence is unmistakably Dutch. At this stage the architect was experimenting with the orders, or he would not have placed the large Ionic pilasters of the order story above the comparatively small Doric columns forming the motif of the basement story. Judging from the engraving of the Custom House by John Harris as it appeared in 1714 before the Fire which destroyed the building, it does not compare favourably with Wren's later work (see p. 160).

Not only does the difference in scale of the ordonnance at each level disturb the homogeneity of the composition, but the sequence between the projecting wings and the main portion of the façade is lessened rather than increased by the introduction of the three pedimented features to the central portion. When erected the building was novel enough in conception to please contemporary taste; it exhibited Wren's usual mastery of general outline and judicious selection of material, but it lacks the unity of the Town Hall at Windsor or of Bell's masterpiece at King's Lynn. The description of John Macky in 1714 does not refer to its architectural defects, but commends the arrangement of its offices, which it must be conceded Wren ever contrived to suit the needs of his buildings. Macky's description reads:

"This office is a Noble pile of Buildings built on the River Side below the Bridge, to whose Kay Ships of the greatest Burthen come up. The necessary Offices of

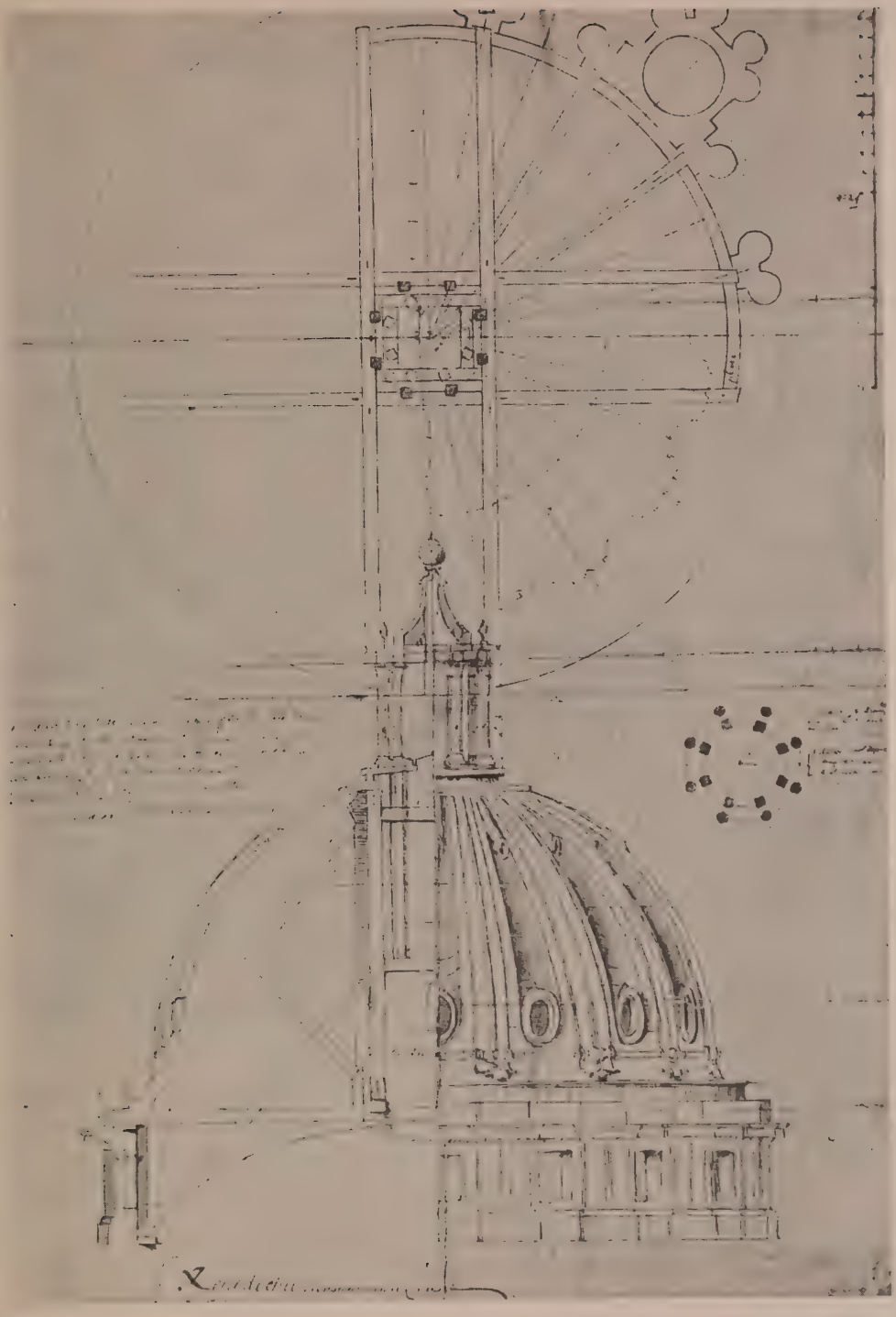
the several Branches of this extensive Revenue are disposed in this great Buildings with the greatest Regularity and Order imaginable. Here is no confusion, notwithstanding the Vast Affluence of People that come every Day to make the Report and the Entries of Ships Outward and Inward Bound; and in the Long Room it's a pretty Pleasure to see the Multitude of Payments that are made there in a Morning."

In this building Wren had a great opportunity. His idea of an open colonnade was the right one considering the nature of the traffic and the size of the quay; the position of the Long Room at the first floor level was well chosen, but his inexperience at this period in expressing the plan in a vertical direction is revealed by the misapplication of the orders and features already mentioned.

After the fire of 1714 the Customs House was rebuilt by Thomas Ripley, who followed the same plan and repeated some of the defects of Wren's elevation.

Contrary to expectation, Wren did not prepare a design for a new bridge, but gave as his opinion a method whereby London Bridge might have been improved. Wren's idea was to take away the alternate piers of the ancient structure, thereby resolving two openings into one in order to reduce the rush of water, and to ensure a fall of not more than nine inches. He proposed retaining the "Gothick" form as being stronger (see Plate, p. 156). There is an illustration of this design in Maitland's History of London. It is also significant that Sir Robert Taylor carried out the idea in part when he increased the size of the central opening and repaired the Bridge in 1750.

After the Fire the rebuilding of both business and



Drawing of Greenwich Hospital Dome. Half-Section Elevation and Plan. The Writing on Left Side of the Drawing is by the late Professor P. L. Donaldson. "This," he writes, "appears to be an original drawing of Sir Christopher Wren, a rough draft by his own master hand. The Latin title is characteristic." (R.I.B.A. Collection.)

residential quarters proceeded apace, but such was the respect shown for the ancient thoroughfares of the City, to preserve parish boundaries and to repair the City gates, that the wider issues of future convenience were left in obscurity.

Custom had long defined the place where the Lord Mayor of London should hand over the civic keys to the sovereign when the latter was pleased to visit the City. The earlier Bar attributed to Inigo Jones had been found prior to the Fire to be too much of an obstruction.

There was, even in 1670, sufficient information regarding Roman triumphal arches to have helped Wren to a more academic rendering than the design actually executed ; it is probable that he had seen an engraving of the " Bridge of Sighs " at Venice, and possibly referred to Serlio's book for a preliminary idea, but such consideration did not lead him into the paths of copying, for he was never at a loss when sheer invention was needed. The task here was to contrive a screen monument to be approached from two sides, with three openings in its lower part and sufficient sculptural interest above to hint at the privileges of the City within. The architect combined in the finished work all that could be expected to fit in with monarchical whims and forensic taste. How he succeeded can best be judged from the present aspect of the Bar as an entrance lodge at Theobalds Park. Wren in this design could no more escape the tone and fashion of his day than the Papists could be weaned from ideas of a restoration of the ancient faith. By intuition he caught the spirit of late Italian baroque and contrived to marry dissimilar arcuated forms with a superstructure of Corinthian pilasters, the latter expressing a sort of book-store over the carriage-way.

The design is unified by the curve of the segmental pediment, which carries in the tympanum a sort of flat sarcophagus. There is no crush of sculptural interest such as the group of gesticulating figures never absent from the chief point of interest in Italian work. Temple Bar has been likened to the head of a "King Charles spaniel"; viewed in full it has been compared to the full-bottomed wigs then fashionable and "lately out of France"; it may even suggest the case of a bracket clock by Daniel Quare. Wren caught the prevailing spirit which contemporary opinion associated with the picturesque, and pleased both citizens and courtiers, so, whatever may be urged against this structure, it certainly has the merit of character. At Theobalds Park it is out of place: time may yet bring it back to London, if not to its original setting, at least to a new position on the Embankment.

So many of Wren's public buildings have been swept away or destroyed by fire that, if it were not for old engravings, it would be impossible to write much about the planning arrangements; such a case is presented by the College of Physicians, that for a century and half graced the precincts of Warwick Lane and Amen Corner (see p. 123).

Four years after the Fire, a considerable sum of money was raised for the erection of a new building to house the powerful body of doctors. Most authorities incline to the view that the services of Wren were solicited to prepare the design, although there is the probability to be considered that Dr. Robert Hooke, the architect of Bethlehem Hospital, may have been associated with him to arrange the internal requirements and fitments.

From Warwick Lane little idea of the extent of the

site could be obtained, but the entrance gateway with the domed theatre over was familiar to all London.

Ralph, who wrote " A Critical Review of the Public Buildings of London " in 1739, says that it is " a building of wonderful delicacy, and eminently deserves to be considered among the noblest ornaments of this City ; and yet so unlucky is its situation that it can never be seen to advantage, nay, seldom seen at all, and what ought to be conspicuous to everybody is known only to a few, and those, too, people of curiosity who search out their own entertainments."

It is fortunate that Buckler made careful pencil sketches in 1828 prior to the devolution, for from these explicit line drawings some idea of the scale of the theatre and entrance gateway can be gleaned. None but Wren would have dared such a striking composition or one so thoroughly expressive.

The gateway opened on to a large paved court, around which were grouped the offices, the lodgings for the professors and the quarters of the curator. Immediately in front on the axial line was the Hall and Court Room, which Wren emphasised by appropriate elevational treatment. Having settled the design of the gateway and determined the section of the theatre over, Wren next gave attention to the frontispiece of the Hall and Court Room, which viewed from the entrance archway would form the chief feature in the ensemble. He does not appear to have considered the sides of the courtyard as part of the scheme, and preferred to butt the subordinate cornices of the latter against the Corinthian pilasters of the Court Room. The gateway and the theatre in consequence must be considered as a species of anti-climax, for no amount of skill could reconcile the scale of the dome with its gilded finial to the delicate

cupola above the pediment of the Court Room. In this design Wren had many difficulties to surmount. The conditions played no unimportant part in the allocation of the three portions of the scheme, namely, the theatre or entrance, the domestic quarters and the official meeting-place of the savants. As a piece of original design the theatre had merit, although the outline of the dome called for criticism. The frontispiece to the Hall and Court Room had a character associated with learning, while the offices and residential quarters were equally expressive. It has been suggested that if Dr. Hooke had a hand in the work, it is apparent in the design of the principal side of the courtyard, but it can hardly be credited that the good offices of Wren would have been lightly disregarded in the realisation of every part of this extremely important scheme. In the buildings of the late seventeenth century the chief difference between English and French practice seems to have been in the treatment of plans. A French architect would never have departed from the principle of making all features lead up to a point of culminating interest, and no amount of reasoning or persuasion would have made a Mansart or a Le Mercier introduce an anti-climax into an otherwise ordered design. Such criticisms as the foregoing may appear trivial to some minds, but considered largely they belong to the very essence of fine architecture ; the very defects inherent in some of Wren's public works, far from detracting from his merits as a great architect, throw into even stronger relief the humane characteristics of the man.

His difficulties were enormous; he had to face contingencies for which there was little or no precedent, he had few authorities with whom he could confer, and although engravings of foreign buildings were available,

Original Drawing by Sir Christopher Wren for the Head of the Monument. (British Museum.)

the main secrets of Continental practice, particularly regarding academic planning, were not revealed. By sheer strength of personality Wren produced buildings of his own fashioning that more than answered contemporary taste and conditions. Investigation of his methods is essential in the cause of art, and the defects, once understood, are more than counterbalanced by the vitality and masculinity of the result.

Those who promoted the idea of a monument to commemorate the Great Fire lost sight of the fact that no monument more fitting than the rebuilding of the City of London was needed. Wren, who had almost completed Temple Bar, was naturally called upon to furnish a design after a preliminary tussle as to choice of site. The architect, having in mind the crowded effect of roofs, spires and chimney-stacks, hit upon the original idea of a single column of gigantic dimensions, such as would rise up and be seen from all quarters. The idea was new for this country, notwithstanding columns of this type had formed features of old Rome. Wren, who had certain particulars of Trajan's Column, determined to make the London example much higher, hence its dimensions of 202 feet. The first design submitted for the approval of Court and City shows a Roman Doric column, without flutes, with flames appearing at intervals on the shaft, the intention being to symbolise the ravages of the Fire and also to hide the windows of the circular stairs within. This fantastic design did not meet with approval: perhaps it evoked the censure of John Evelyn, whose mind and taste inclined to more serious expressions. The executed design is of sturdier proportions than that originally schemed, for it was the architect's intention to place a colossal statue of Charles the Second on the circular pedestal above the abacus. For

some reason the statue was never executed, the present metal finish being deemed more suitable. The building of the Monument, by comparison with the cost of some of the new churches, was an expensive affair, the total expenditure amounting to £8856. The value of money in those days was approximately seven times the present value, therefore some idea of the cost to-day can be obtained. Wren placed the Doric column on a pedestal twenty-one feet square ; this stands on a plinth about six feet wider. The lower diameter of the column above the apophyge is fifteen feet, and the shaft encloses a marble staircase of 345 steps. Great care was taken to give the column a proper entasis as well as to adjust the capital and abacus to suit the unusual proportions of an isolated column. Wren, without acquaintance with Greek methods of working the fluting *in situ*, hit upon the same idea pursued by Ictinus at Athens for the gigantic flutes for his column. Any other methods of working would have been impossible, for not only would the junctions of the fillets have been awkward, but the entasis to fillets and flutes could not have been properly maintained for the complete height. The fluting took the place of the absurd flames shown on the preliminary design, and serves the same purpose of partially concealing the narrow windows to the stairway. The site, chosen for local reasons, has never been improved, either by the rebuilding of London Bridge or by the City buildings which from time to time have been added in the vicinity. Very shortly it will be obscured from many points of view. The sculptural interest above the pedestal is virile and well executed, the sequence of the mouldings is beautifully maintained, and the lettering is in the best taste. Considering the period when it was erected, the Monument, although lacking the beauty of the Roman

examples, is a remarkable instance of Wren's skill and originality, and, moreover, records in an appropriate manner an event which even to-day has not lost its significance.

The remodelling of Christ's Hospital and the design of the Latin School fell to Wren's province in 1682. The long brick façade formerly parallel to Newgate Street, and forming a delightful foil to the tower of the church which the architect added in 1704, had qualities both of design and association entirely its own. It is nearly a quarter of a century since it was levelled. Although a comparatively small building, the architect spared no pains or skill to increase its apparent size.

As with the gateway to the Middle Temple, which will be referred to later, Sir Christopher Wren treated the front as a street composition, moved doubtless to such a course by the desire to express the sides of the repaired mediæval quadrangle within. The front consisted of eleven bays marked by gauged brick pilasters of slight projection. The pavilion ends were distinguished by coupled pilasters and finished with straight-sided pediments which were foiled by a traditional roof of steep pitch. The centre was emphasised by a large segmental pediment embracing three bays. Such was the architect's skill that he contrived to make the western pavilion of greater dimensions than that heading the approach from Newgate Street, and at the same time varied the character; the most remarkable illusion being that, until the façade was measured, few realised the difference. The screen of gauged brick pilasters was foiled by the coarser brick walling. The wood cornice and contrasting lines of the three pediments gave the front a benevolent and spectacled appearance, hinting at the formation of the quadrangle within. There was more of the good-natured

schoolmaster in this assemblage of commonplace material than evidence of self-conscious pedagogy. In this front Sir Christopher Wren transgressed all the laws of composition, yet the result justified the experiment. To form a composition of eleven bays of varying size, unified by a great roof, required not a little invention. Wren did not have recourse to clumsy breaks to achieve the effect, but produced the contrasts solely by entasised pilasters and breaks in the bed mould of the cornice. Sir Christopher found time to give advice and detail for the Court Room in the School and also planned some of the offices.

Although belonging in part to the domestic section of the great architect's work, the austere blocks and chambers within the precincts of the Inner and Middle Temple are nevertheless of a semi-public character. The terracing of chambers to King's Bench Walk, as well as the blocks in Hare Court, Pump Court, New Court, the Cloisters and Lamb Building, are examples of economy and austerity combined with good taste. Where occasion demanded, wooden cornices have been introduced as unifying features to tier upon tier of sashed windows, with a few mullioned windows interspersed. Perhaps the best example of this method of building is afforded by the blocks in New Court. The gauged brick doorways are also outstanding features, particularly No. 5, King's Bench Walk, which has carved stone capitals. The iron railings enlivened at intervals with rich panels, scrolls and vases; the moulded plat bands marking the floor levels, and the simple panelling of the interiors fulfil all the requirements demanded.

In the remodelling of the Temple Sir Christopher Wren was faced with a problem similar to the greater one then occupying the attention of the Civic authorities;

Portrait Bust of Sir Christopher Wren. By Edward Pierce, about 1673. He was sometime assistant to Wren, under whom he is said to have built the Church of St. Clement Danes. (Ashmolean Museum, Oxford.)

for example, he had to keep in view the retention of the ancient outlets to Fleet Street on the north side, as well as to combine both the Temple Church and the Elizabethan Hall of the Middle Temple within his scheme.

The design of the Cloisters, otherwise plain, relies for effect on its "Tuscan" arcade with a row of columns at the centre of the middle space, the latter so grouped as to help the circulation of traffic and to give perspective charm in all directions.

Lamb Building is distinguished by the pentice and carved consoles over the entry. No. 2, King's Bench Walk, recalls Wren's handling of the Storehouse admired by Pepys. This building, which the architect considered a prominent point, has a feature of unusual interest; namely, the breaks at the corner, which impart a sense of strength and richness to the plain surfaces. These breaks are carried up through the wooden cornice between the latter and the steep roof, forming three points of interest. In addition the walls have a definite batter or entasis which after its introduction by Wren became part of the creed of masons and bricklayers. Investigation of other contemporary buildings, such as the blocks forming the outer-works of Gray's Inn, confirms the theory that refinements of this nature received every consideration. In passing it must be conceded that the sets of chambers or tenements within the Temple are the prototypes of the modern idea of self-contained flats.

Wren's work in the Temple began in the year 1677; in the last year of King Charles's reign it was brought practically to completion by the erection of the Middle Temple Gatehouse—the chief entrance to the open spaces, narrow alley-ways, courts and gardens extending from Temple Bar to the river southerly and from the

frontier of Alsatia to Essex Street westerly. As previously mentioned, the Temple Gateway, like the vanished front to Christ's Hospital, is one of the few instances of Wren's treatment of a façade abutting directly on the street. The building is four stories high, including the rusticated basement, in which is the gateway for wheeled traffic, a postern opening and a porter's lodge. The frontage measures some forty feet; this factor, together with the opening for wheeled traffic at the centre, determined the position of the ordonnance, which in this example consists of straight-sided pilasters framing within their height three tiers of windows, the latter diminished in height to suit the rise. The central opening is arched with flat voussoirs, and the casement windows to the first floor open on to balconies carried on stone corbels. The whole façade is, in fact, a screen of wrought stone carrying an entablature and triangular pediment, the infilling being of gauged brick. Wren's ingenuity is here revealed at its best; not in the grouping of three tiers of windows within the embrace of a single pilaster order, not in the selection of detail and the choice of material; on the contrary, it is associated with the subtle junctioning of the Order Story with the rusticated basement and the total absence of meretricious ornament. No other public building of the period and type in England is such a direct statement. None could be more suited to its situation. Almost unnoticed when completed, it was lost sight of in the hurly-burly of the eighteenth century, and ignored when the first Wren revival took place some eighty years since. This dignified elevation is now recognised to be one of the outstanding monuments of the period.

By 1684 Wren had arrived at a true estimate of what the abstract quality, masculinity, meant in buildings.

Temple Bar. T. H. Shepherd del. From an Old Print, 1824.

Some opinions have assigned the character of the Middle Temple Gateway to the style of Inigo Jones ; it belongs, however, to a different sphere. If Wren's fame rested upon the merits of the above-mentioned façade apart from other works, he would still have a claim as a master. It is all the more to his credit that it was built at a time before the full leaven of Classic influence had reached England ; yet Wren endowed it with a dignity and spirit worthy of the hand of Peruzzi. Few there are who have stopped to analyse the treatment of the rusticated basement story and the way in which the sequence of prominent stone surface is maintained from basement to pediment. In addition the pilasters, devoid of an entasis on their sides, have an inclination inwards together with the whole of the vertical surface of gauged brick. Wren knew nothing of the refinements of the Parthenon, yet his instinct led aright, and it is by such care that the building reaches conscious height.

It is said that the idea of building the Hospital at Kilmainham, on the outskirts of Dublin, originated with Lord Granard, then commanding the King's forces in Ireland. Application having been made to Charles the Second, Wren was instructed to inspect the site with all convenient speed. No record, however, exists of the architect's visit to Ireland, but the design could not have been produced by any other hand or devised with such certainty of purpose. The building is one of Wren's most consistent designs ; it is less ambitious in scale than Chelsea Hospital, for which it may well have been taken as a model, having regard for subsequent improvement and increased size. At Kilmainham Wren decided upon a quadrangular plan, grouping his simple buildings of two stories around a large court ; the theme internally being simple arcading for the lower

Mr. Vanbruck

I desire you to excuse me to the Comissioners to day. His Grace of Canterbury hath appointed a Comission at Paules this morning the same Hour; from wch I cannot be excused. The best businesse wherin the Comission of the Fabric of Greenwich can imploy their time, is to consult of mony; this at present is the only necessary thing; if this can be speedily had, the Worke will proceed I hope to a covering. if otherwise it is better to cover up the walls before frost & Snow: & if against Spring mony be got into the Treasurers hands before hande, wee shall make the better bargains & finish sooner then wee can by running in Debt.

Fryday Morne

Your affectionate freind & Servant

Cr. Wren

Facsimiled Copy of Letter from Sir Christopher Wren to Mr. William Vanbrugh (Vanbruck), who was Secretary to the Commissioners of Greenwich Hospital from the beginning. Evelyn refers to this appointment May 31, 1695. (R.I.B.A. Collection.)

Royal Hospital, Kilmainham, Dublin.

part with squared openings above. A roof of steep pitch enabled rooms to be placed within it, and dormer windows complete the effect. The elevations are of simple character, with the exception of that on the north side facing the River Liffey, the walls of which emphasise the Dining Hall and the Chapel. On this front above the pediment rises the tower, which was built in 1707. The character of the latter is so much at variance with Wren's usual ideas of cupolas and clock turrets as to suggest the work of a subordinate. As originally built, the walls externally, with the exception of the north front, which is of rude stone, presented the horizontal lines of brick-work which distinguishes so much of the work of the time, but at the beginning of the nineteenth century, owing doubtless to damp arising from weather troubles, the walls were rough-casted, much to the detriment of the general effect. Externally there is no sign of the open arcade within, the walls in this case being divided into two parts by a moulded string-course which emphasises the horizontality and at the same time unifies the repeat motif of the windows, which are the same in detail to both floors. The only strong architectural expression the architect allowed was on the north side to the terrace, where the great hall projects sufficiently in advance of the general frontage to serve as a pedestal for the tower over, which latter appears to ride on the pediment contrary to Wren's usual methods.

Here are to be seen four Corinthian pilasters with authentic capitals, but, strange to relate, the pilasters have no bases and appear to start direct from the earth, in fact no attempt appears to have been made even to break the plinths around them. The great windows on this front are arched and deeply recessed. Malton, whose pictorial representations can be relied on, shows

arched windows with radiating sash bars in the heads. It is therefore evident that the windows were Gothicised when the rough-casting was done. From a close study of the building it can be deduced that Wren furnished the ground plans and elevations and entrusted the execution of the work to local supervision, for it is hardly conceivable, the preliminary inspection of the site apart, that he could have been spared from his multifarious duties in England to superintend the details. On the other hand, the beauty of the finish is such as could only have resulted from accurate drawings and descriptions.

Kilmainham has more of the great Almshouse about it than the military hospital or garrison for the infirm. The local title, "Old Man's Hospital," may fully describe the peaceful disposition of the walls, set upon the plateau amidst umbrageous groves that stretch to Phœnix Park. There is to be seen in its conception that regard for order, elegance and regularity which Wren ever imparted to works of vast scale. The detail also, in spite of slight inaccuracies, has a charm entirely different from that of contemporary work by the same master in England, no small tribute to the talent of the local artificers who carried the architect's work into being at a time when Classic architecture was entirely foreign to the Irish capital.

Strange as it may seem, Kilmainham has not received the consideration it deserves, not only as an example of building on the grand scale, but by nature of its site and the arrangement of its terraces and subsidiary buildings. None but a master could have conceived such a scheme, and only sound organisation could have brought it to a successful issue.

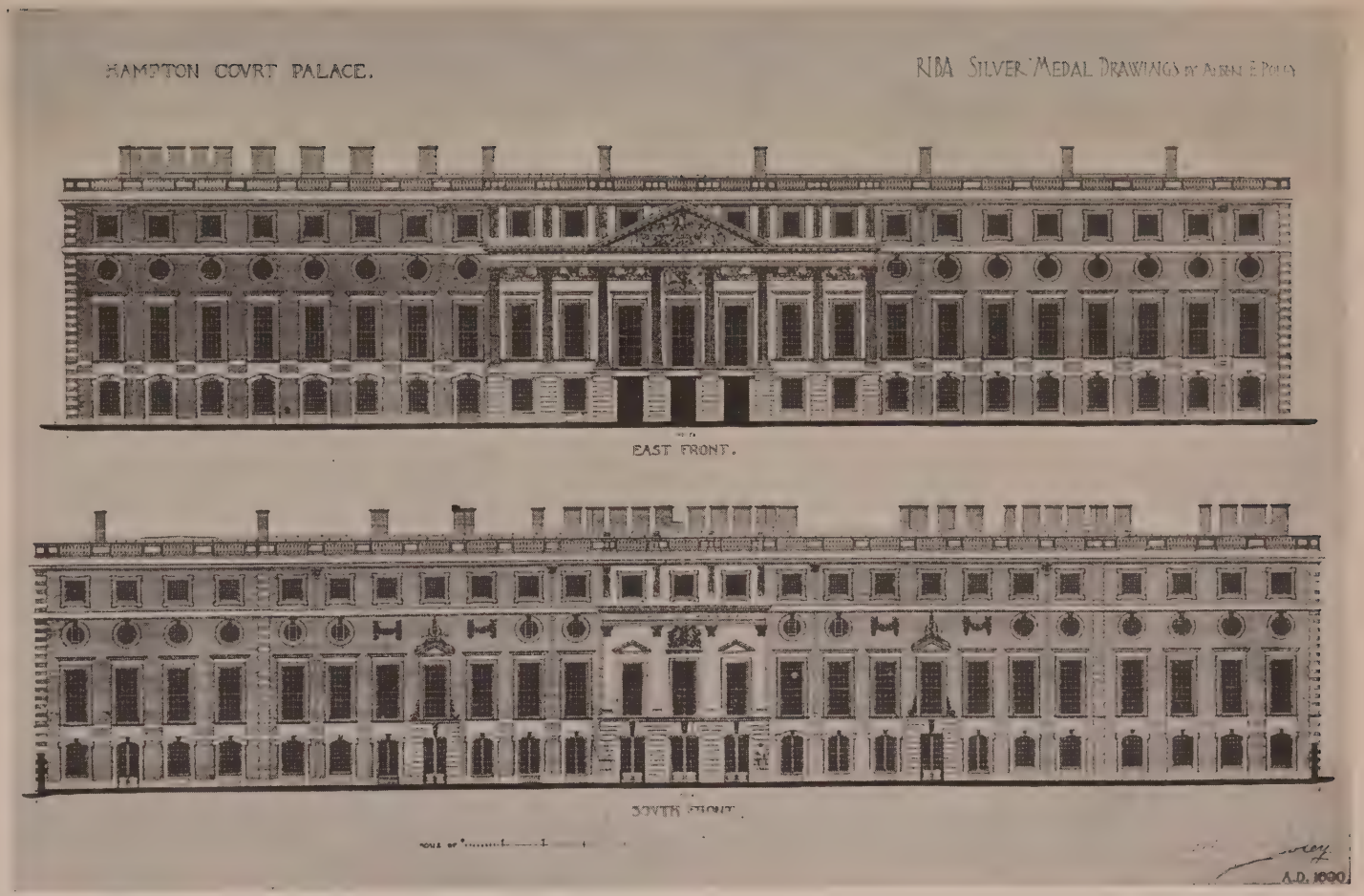
The building of the Royal Hospital at Chelsea for disabled and invalid soldiers belongs to the period of

Wren's greatest activity. It is a trifle later than the similar institution at Kilmainham, the foundation stone of which was laid by the Duke of Ormonde in 1680. At this time Sir Stephen Fox was Paymaster-General, and it has been suggested that the building of the Hospital near Dublin drew his attention to the need of a similar establishment on the outskirts of London. Another account, far more romantic, states that Nell Gwynne, who held the land at Chelsea as a gift from the King, being present when the scheme was under discussion, offered it back in view of the charitable nature of the proposal. Wren, in company with Sir Stephen Fox and Evelyn, evidently arranged all the necessary preliminaries early in the year 1682, and about the middle of February the King laid the foundation stone.

Chelsea Hospital, in spite of subsequent attentions and the growth of the surrounding streets, still retains the grandiose aspect which entitles it to recognition as one of the most important of seventeenth-century public buildings, for, as Horace states, "the wine-cask long retains the odour which it has once imbibed." It is one of the most successful of Wren's public buildings, not only on account of the immense range of rooms schemed into one vast unified plan, but by reason of the pictorial effect of the composition as a whole, which stands unveiled to the veriest tyro as the embodiment of a charitable idea. It is evident that Wren aimed at an ideal plan for the then unique object of housing soldiers no longer fit for service. The skill of the architect is to be seen in the way he disposed the blocks so as to hold the maximum amount of light and air in the three-sided central court. Wren had no need to study angles of light and determine degree to achieve this, for he understood the broader meaning, "atmosphere in the plan" (see Plate, p. 157).

The disposition of the buildings forming the main and lesser parts of Chelsea Hospital permits the majority of the rooms to be lit from the south, the east and the west—no small achievement in a building of such size. The exigencies of the plan, however, led Wren into a pictorial difficulty at the centre of the courtyard on the south front. To obtain warmth and sunlight for the King's pensioners the architect had dared much in the extreme depth of the retreats on either side, which subordinate unduly the Doric portico and cupola at the centre. It is a convenient scheme and one that has much to commend it from that standpoint alone. Wren must have been aware of the difficulty of the deep retreats of the wings, but he could find no way to depart from it. Viewed from the south, Chelsea Hospital lacks a central feature strong enough to emphasise the beauty of the plan, more especially the orderliness of its subordinate grouping. In other words, the culminating point, in this case the cupola above the portico, is insignificant as a climax and disturbing at a point where it is essential that it should unify.

It is difficult to say how this defect could have been overcome, especially in view of the position of the Dining-hall and the Chapel connected by the central hall and the portico in question. Wren consistently expressed the plan in this south elevation and was at some pains to introduce balancing pedimental features on each side of the courtyard to complement the pedimented central portico. It is, however, clear that, granting adherence to Wren's plan, no alteration in the architectural treatment is possible. Had the architect had sufficient land at his disposal it is conceivable that he would have abandoned the theory of a continuous roof over Chapel, Hall, and supporting wings, in favour



Hampton Court Palace. From a Drawing by A. E. Poley. (*R.I.B.A. Collection.*)

of a grouping of three isolated blocks in which the centre would have maintained its dominance by detachment. Modern investigation has proved that plans of institutions on a vast scale are better grouped as detached blocks than joined at re-entering angles. The north front to Chelsea Hospital as a piece of elevational architecture is obviously more satisfactory than the south with its deeply recessed centre. Here the difficulties were less : the climax is prominent between the slightly projecting end wings, and strong enough to call the pavilions at the extreme ends to order.

As stated above, Wren began operations in the year 1682, and soon the pleasant fields of Chelsea witnessed the uprising of a forest of scaffolding, while barge-loads of brick, stone and timber were delivered from the river. It was not, however, until ten years later that he was able to instruct his carvers to incise the names of William and Mary on the entablature of the low colonnade.

Chelsea Hospital, called in Wren's time the Garrison of Chelsea, and designed to please contemporary ideas, has the stamp of humanity and little of military harshness. In scale it is as palatial as Hampton Court, in its minor parts it carries that air of neatness and elegance never absent from the brick and stone designs of Sir Christopher Wren.

It is often the case that artists produce their best work when difficulties are manifold. Greenwich Hospital as it stands to-day is beyond question Sir Christopher Wren's masterpiece in public buildings. Not only is the completed design a triumph of architectural composition, but it is one so constituted, thanks to the fertility of the mind that conceived it, and so fundamentally right, both in the disposition of its masses

and the beauty of its parts, as to subordinate and render nugatory all subsequent additions (see Plate, p. 152).

Wren had long been familiar with the site, and knew of the possibilities of enhancing the natural beauties of river and wooded lands by the introduction of conventional scenery, which by virtue of its purpose would proclaim the national genius for sea power. Designed as a sumptuous palace for invalid seamen, it has through the process of time attained to even higher estate as the premier Naval College of the world ; and, paradoxical as it may appear, carries in its grouping an air of modernity, despite its connection with more than two centuries of naval life. No hospital more fitting for those who had manned the King's ships could have been imagined, or monument more expressive of maritime power at London's sea gate, than the dual group of buildings at Greenwich.

The "Parentalia" contains the following extract from the account of the buildings at Greenwich which was published by Nicholas Hawksmoor, then Deputy Surveyor.

> "Her Majesty Queen Mary, the Foundress of the marine Hospital, enjoined Sir Christopher Wren to build the Fabrick with great Magnificence and Order ; and being ever solicitous for the Prosecution of the Design, had several times honour'd Greenwich with her personal views of the Building erected by King Charles II as Part of his Palace, and likewise of that built by Mr. Inigo Jones, called the Queen's House, &c. On which Views she was unwilling to demolish either as was propos'd by some. This occasioned the keeping of an approach from the Thames quite up to the Queen's House, of

115 feet broad, out of the Grant that was made to the Hospital, that her Majesty might have an Access to that House by Water as well as by Land; and she retained a desire to add the four Pavilions to that Palace according to Inigo Jones's design, that she might make that little Palace compleat, as a royal Villa for her own Retirement, or from whence Embassadors or public Ministers might make their Entry into London.

"Her Majesty's absolute Determination to preserve the Wing built by her Uncle King Charles II, to keep the Queen's House, and Approach to it, on the considerations above said, naturally drew on the Disposition of the Buildings, as they are now placed and situated."

From the foregoing it will be seen that Wren's first proposals for a composition of three parts, having a central feature of sufficient importance to form the climax to the central approach from the river, were abandoned for sentimental reasons. Even the Queen's expressed desire to complete the little villa according to Inigo Jones' design would not have increased the architectural effect.

Wren, however, did not entirely abandon his preliminary ideas, for the executed work retains the effect of concentration aimed at in the first proposals. This fact is of extreme importance and must be kept in view in any attempt to analyse the reasons for the emplacement of the blocks. When the architect began his work he had the nucleus of the scheme already in being. There was the river frontage as a base-line, the Queen's House, designed by Inigo Jones for Charles the First's Queen, on the axial line, and near the river the partially built

western block begun by John Webb from Inigo Jones' design under the surveyorship of Sir John Denham. Wren's next move was to express the heart of the design, namely, the two courts with the colonnades facing each other; the riverside angles towards the centre of the whole scheme being each marked by a dome, respectively above the entrance to the chapel on the east side and the hall on the west; the buildings grouped contiguous to the hall on the west side being called King William's block, and those forming the court to the south of the chapel and east of the balancing colonnade Queen Mary's block. It now only remained for the architect to duplicate King Charles's block to the east of the central avenue, which would have the same relation to the river as the original Palace, begun by Webb in 1661.

By the middle of Queen Anne's reign Wren had stamped his individuality on the buildings. The work of Hawksmoor, who assisted Wren, first as Clerk of the Works and ultimately as Deputy Surveyor, as well as subsequent additions by Vanbrugh, Campbell and Ripley, did little to alter the breadth of handling demonstrated from the outset by the master mind of the Surveyor-General. Kings, Queens and meddlers might come and go, but the orderly disposition of the blocks could not be disturbed. The wonder is, that, considering the difficulties, Wren continued a grouping of four great blocks about a centre line without a central dominating feature; for the Queen's House is merely an incident, and has no value in the ultimate grouping. The secret inheres in the dual colonnades and the masterly proportions of the repeat domes. Deprived of the opportunity to demolish the Queen's House and erect a central cupola, Wren proceeded on the principle

of a *tour de force*, arguing that two main features of equal scale, grouped in juxtaposition, would together coalesce and produce an effect of unity. The ingenuity thus displayed can be seen in the perfect adjustment of the domed towers to the grouping of the four courts, both on the river side and landward. From the river the want of a central feature is scarcely noticed; from the main cross-road dividing the blocks laterally no treatment more satisfactory could have been devised, but the domed towers would have lost half their value as dominant motifs if the colonnades had not been carried back to form screens to the balancing courts of King William's and Queen Mary's blocks.

Wren's work at Greenwich has the unusual interest of being the only work of the architect on a great scale that includes earlier work bearing the impress of the style brought into favour by Inigo Jones; and for this particular reason, as well as the fact that Colin Campbell, Ripley and others of the later school worked at Greenwich, it forms the hiatus between the school of Wren and the revised school of Inigo Jones which came into favour with Burlington and Kent. The twin domes of Greenwich rank among the finest of Wren's public work, alike for conception and beauty of detail. James Gandon was alive to this fact, for he selected the character and silhouette of one for the dome of the Custom House at Dublin a hundred years later.

Little alteration has been allowed at Greenwich since the days of George the First, with the exception of the interior of the Chapel, which was destroyed by fire in 1779.

In 1758 Lord Anson obtained the appointment for James Stuart of Surveyor to Greenwich Hospital, which

he held until his death thirty years later. Stuart * was responsible for the design of the Infirmary and the restoration of the Chapel, and at a subsequent period the Boys' School and Dormitory.

There are no records extant to show the interior treatment of the Chapel as designed by Wren. Stuart, to whom the chance of the fire gave rare opportunity to show his skill, struck out a novel design in which he shows his regard for Greek refinement combined with theories then current regarding ceilings and galleries. The effect of Stuart's knowledge and skill was to make the Chapel look twice the size. There is little of old Athens in it other than in some of the detail, but the beauty of the interior is beyond question. Hitherto it has been the custom to assign the wrong date to the period of rebuilding the interior of the Chapel, and to cast aspersion on the merits of Stuart's ability. The truth must be acknowledged that a considerable advance in matters affecting the internal treatment of buildings had been made in the seventy odd years that had elapsed since Wren's connection with the Hospital had ceased. Stuart's Chapel interior is in its way a minor masterpiece of the late eighteenth century, and as much distinguished from the products of the Macaroni school as the masculine designs of Sir William Chambers are from those of the Wyatts. To revert to Wren's work at Greenwich, it is of a higher status than most of the contemporary work in France, and stands alone in its dignity and austerity. It is, moreover, the most original public building con-

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* James Stuart (1713–88), "Athenian Stuart." Joint author with Nicholas Revett of "The Antiquities of Athens."

nected with the genius of the architect and a lasting monument to the skill of one who, frustrated in most of his schemes, succeeded in achieving his purpose notwithstanding interference and parsimony.

It has been endeavoured to point out that many of Sir Christopher Wren's schemes, either for partial rebuilding or for structures entirely new, were subject to preliminary conditions over which he had little control. Considering the troublesome times in which he lived and worked, as well as the necessity of training craftsmen and artificers to carry his ideas into being, the excellence of the result is all the more telling. The range of his practice appears enormous ; he had not only to conceive, but to organise ; to allay suspicion and produce effects calculated to satisfy. His buildings show the strength of his personality and his physical and mental stamina. None but a man of great intellect and enormous staying power could have withstood the strain of work, jealousy and intrigue to which he was subjected without cessation.

Dutch William had a singular preference for Hampton Court and little sympathy for Whitehall. Hence it came about that in 1689 Wren was instructed to prepare designs for the building of a new Palace to augment that raised by Cardinal Wolsey. The architect's first scheme, customary to his method, was on grandiose lines. In addition to the State apartments actually executed, he designed a vast fore-court on the north side with a hall at the centre approached by a double staircase (see Plate, p. 144).

This fore-court was to be flanked by open courts having screen colonnades. There was to have been a central entrance carried across the Moat and continued with the mile-long Chestnut Avenue of Bushy Park. It

was left to Talman * to carry out the Avenue, planted in 1700, and this appears to have been the only attempt made to give the reconstructed Palace a proper approach by road. It had been Wren's ambition gradually to reconstruct the whole of Wolsey's buildings, but events determined otherwise. He began operations by demolishing the portion known as Cloister Green Court, which occupied practically the site of the present Fountain Court in the projected rebuilding. The scheme then entered upon included the colonnade on the east side of the Clock Court (from which latter a hint is obtained of what the character of the colonnades for his first scheme would have been), the two great staircases, Fountain Court, the great façade to the east and the south front overlooking the terrace and the Privy Garden. The foregoing work, together with the garden walls, entrance gates, garden houses and iron screens, the subsidiary buildings and renovation of parts of the Tudor structure constitutes the design actually executed. Wren wisely made no attempt to follow the proportions of the earlier buildings; on the contrary, he had in view a range of spacious apartments expressed externally by severity of outline and studied monotony which enhances the effect of the ensemble and blends the new with the earlier brickwork. In this partial rebuilding Wren aimed at balance and simplicity; he did not deign to emphasise the comparatively slight breaks of the façades with a variety of outline in the

* William Talman (fl. 1670–1700), Comptroller to the King's Board of Works, and had charge of Hampton Court Palace under Wren. A folio volume of his drawings is in the Library of the Royal Institute of British Architects.

roofs. As a result, the outer walls of Hampton Court are direct in statement and entirely original. Such a treatment makes it clear that the columns were introduced purely as decoration on the two principal fronts. The charm of Hampton Court exists in its squareness, as well as in the harmonious blend of its materials. It is, moreover, a building relying on mass and colour for its principal effects, a point expressed most truthfully in the solicitous care of the architect to carry the blend of stone and brick through the buttresses of the appendage garden walls. The result was a building to warm Dutch William's heart and to bring him increased homage from his English subjects. There is, however, nothing foreign in the domestic quality of Hampton Court. The first-floor windows are expressive of the state-rooms, while the circular windows introduced to give additional light to the high-pitched rooms suggest in a good-humoured way that if Louis the Fourteenth boasted one *Œil-de-bœuf*, King William had threescore and ten, although some of the latter were blind.

Throughout the work externally and internally the masterly touch of Wren is apparent. There is no finer Classic arcade in Europe than that which forms the surround to Fountain Court, and whatever may be urged against the crowding of the fenestration in this court or the richness of the details, such criticism is answered by the manner in which the sequence is maintained vertically from the arcuations of the basement story to the delicacy of the crowning balustrade.

It will be of interest to many that Wren varied the size of the quarries to his sashed windows, a departure especially noticeable in the first-floor windows on the west side of Fountain Court. On the main east front the windows between the central Corinthian columns

have quarries unusually large, the variation, it is suggested, being made to avoid confusion from a distant view along the central avenue in the direction of the Canal. In the spandrels of the arches on the east side of Fountain Court, Wren began with brickwork but evidently changed his mind, for the spandrels to the other three sides are of stone. To rectify this defect he had recourse to a light skimming of cement jointed to look like stone. It is a small point in itself, but nevertheless it is eloquent of the watchfulness of the designer, who considered ultimate effect to be as important in the design of buildings as construction. There are many such touches in Wren's work which could only have emanated from the architect's critical mind. From an observance of such ingenuity it is possible to reconstruct scenes between the chief artificer and Wren regarding the stopping of a set of impost mouldings against a pilaster, and to follow Wren's train of thought in the thoroughness of detail evidenced alike in the principal court as well as in the subordinate areas. It is impossible to disregard the slow rise to power and confidence in design which marks each stage of the architect's career. Neither is it just to dismiss lightly with flippant remarks this or that ornament or detail for the sake of making a diversion. The treatment of the four walls of Fountain Court has called forth ill-considered criticism, regarding the marking of the level of the first floor, the supposed crowding of the windows and the lack of reticence. It must be remembered that this work especially is in full sympathy with the baroque spirit then prevalent. Something more than an insipid treatment was required. In other hands the result might have been dreary in the extreme. Wren, however, succeeded in retaining light, colour and atmosphere,

To Her moſt Excellent Maj.ty *QUEEN CAROLINE* this *Perſpective View* of the ROYAL HOSPITAL at *GREENWICH* is humbly Inſcribed by Her Majeſty's moſt Dutiful Subject *Thomas Lediard* Anno 1735

besides giving richness with the slightest of sculptural interest.

The south side of Fountain Court rises but one story above the Cloister; to contain the communication gallery linking the King's apartment with the Queen's, Wren in this case was content to mask the Tudor walls in the distance by arranging richly sculptured vases to stand on the pedestals of the balustrade. Another feature should be noticed at this point, namely, the chimney-stack from the fireplace in the Gallery. Where another hand would have been content to allow the stack to assert itself without preparation, Wren went to some pains to make the utilitarian feature handsome. As it is, the stack with its panelled surfaces and rising curves appropriately demonstrates its purposes and becomes an integral part of the design.

With Wren was associated a host of artificers; there was Gibbons to do the carving, Tijou to hammer the ironwork, and Daniel Marot* to dance attendance on his Royal countryman with schemes for decorating and furnishing, and perhaps advise on the Dutch character of the Gardens for Talman to finish.

During the whole course of the rebuilding by Wren Talman appears in the background as an evil spirit ever ready to find fault and to carry tales to ready ears.

Although Hampton Court rightly belongs to the category of Wren's public buildings, in many respects it is the finest of his domestic essays. In this work

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* Daniel Marot (born about 1660), a French architect who was appointed architect to Prince William of Orange, whom he accompanied to England in 1688. His published volume, "Œuvres," etc., contains a plan for a *parterre* at Hampton Court.

he proved to English eyes the suitability of building without an exaggerated sky-line, a fact appreciated and made clear in the minor houses of Queen Anne's reign that sprang up in all districts around London. He realised too that the nature of the country and the proximity of the river made strong colour imperative, hence the use of cheerful brick for the infilling between the vertical lines of Portland stone, and the care shown in selecting a brick of stronger texture for the basement story to blend with the stone surrounds of the segmental-headed windows.

Wren's work at Hampton Court is but a fragment of his real intentions; by comparison with Versailles it is a mere barrack. Yet there is the peculiar attribute of scale in its mass which makes it appear larger than it really is; there is a humanity in its design that reconciles it with normal requirements; and what is of paramount importance there is a reasonableness of functional quality that raises its fabric above the level of petty considerations, the whims of schools and the foibles of fashion. It is not to be wondered at that Wren ever maintained his affection for this spirited child of his imagination, or that instinct led him in his retirement to the house on Hampton Green just beyond the boundary walls which his skill had created. For his homing instinct must have told him that he had made a real home for kings, and with such reflections he could at leisure re-enact the scenes of his activities within reach of familiar walls.

The Royal Palace, Winchester, 1683, belongs to an earlier period than Hampton Court, but, similarly to the latter, it was designed on grand lines to vie with the scale of Versailles which had roused the cupidity of Charles the Second. The works were begun in 1683, but the death of the King put a stop to the furtherance

of the idea. The site chosen was above the city of Winchester on the western height immediately in line with the west front of the Cathedral, with which it was to be connected by a broad avenue. Subsequently the fragment was used as a barracks, but fire eventually swept it away.

Wren's work at Kensington belongs more particularly to the domestic side of his labours; it has none of the grandeur of Hampton Court nor the comprehensive quality of Greenwich. It was, however, impossible for him to touch anything without improving it, as the additions made to Nottingham House show.

The architect's part seems to have been the remodelling of the existing house and stables—and the addition of a new south front, which latter is remarkable for the design of the "dry" attic in the centre. Evelyn records a visit to it on February 26, 1690. "I went to Kensington, which King William had bought of Lord Nottingham and altered, but was as yet a patched building." Six years later Evelyn writes: "I went to see the King's House at Kensington. It is very noble, but not great." There are, however, at Kensington some distinctive doorways. The internal fitments are comparable with other examples of Wren's skill at Hampton Court, especially the fireplaces and the treatment of the panelling. The best feature, however, is the Orangery which Wren built for Queen Anne in 1704. And with this perfect building must be coupled the Alcove in Kensington Gardens.

In the design of the Town Hall, Windsor, 1688, Wren betrays his knowledge of precedent in so far as the academic qualities of the Renaissance are concerned. The side elevation has strength and dignity, the Doric columns expressing the trabeation within, but the in-

troduction of an arcade of elliptical arches at either end seems uncalled for, besides being out of scale with the Corinthian pilasters over. Other minor buildings attributed to Wren include Trinity Almshouses in the Mile End Road, Morden College, Blackheath, and the base of the statue of Charles the First at Charing Cross. Marlborough House in London was the result of his pencilling, but it has been so disfigured by alterations as to have lost its original character. The Deanery in St. Paul's Churchyard belongs to the domestic side, but the official character of the entrance allows of its inclusion among the list of public works. It is also certain that the design of St. Paul's School emanated from Wren.

Honywood Library and Cloister, Lincoln, 1679, is one of Wren's works that is seldom referred to because of the storm of criticism generally raised regarding the attachment of a Classic building to a Gothic Cathedral. Apart from the incongruous effect of two dissimilar styles, this fragment of architecture has considerable merit, inasmuch as it shows a new version of Wren's outlook. The unusual slenderness of the columns forming the cloister arcade and the different treatment of every third window in the eleven bays over distinguish it as a work above the ordinary. Honywood, the founder of the Library, who had lived at Utrecht during the Cromwellian régime, certainly saw nothing incongruous in Wren's application of a Classic fragment against a Gothic wall, and Wren, true to his convictions, built as his manner directed.

We have seen how the great architect could fashion public monuments, hospitals, palaces, and schools on lines calling for novelty and skill in design and construction. So it was with the great library of Trinity College, Cambridge, which Wren designed gratuitously

These Plans of LONDON BRIDGE *exclusive of the Houses No. 1 As it may* [illegible] *As it may be altered by reducing the Arches* [illegible] *unto the* R^t HON^{ble} Sr RICH^d HOARE LORD MAYOR [illegible] CITY [illegible] Charles Labelye [illegible]

The Plan *and* Western Front *of* LONDON BRIDGE exclusive of the House [illegible] the Sterlings *reduced to such a* [illegible] *as to afford twice as much Water-way as they do at present.* — *N.B. By this Sketch it appears that the clear Water-way* [illegible] *Wah water is* [illegible] *feet and at low Water* [illegible] *feet and the Perpendicular fall only* [illegible] *Inches.*

The Plan *and* Western Front *of* LONDON BRIDGE *to which it might be altered is according to the opinion of the Celebrated Architect* Sir Christopher Wren *by taking away every other Arch & reducing two into one* [illegible] *By this Sketch it appears that there would be at all times a Clear Water-way of* [illegible] *feet & the fall would not be above* [illegible] *Inches at the* [illegible]

The Royal Hospital at Chelsea. From Maitland's "History of London."

for his friend Dr. Isaac Barrow. The problem in this case was to complete the river side of Neville's Court. As usual, Wren's preliminary scheme differed in every way from the one eventually carried out. Even Dr. Barrow could not be persuaded to favour a circular building with a domical roof. Yet half a century later Gibbs erected the highly successful Radclyffe Library at Oxford practically on this plan.

The elevation of the building to Neville's Court shows a rendering of a Palladium theme, but the marking of the Library floor between the arcading of the lower story is unconvincing. The river front is a totally different proposition, for here the architect has risen to inspired heights. The façade is divided horizontally into two parts, the upper slightly dominant. Without having recourse to breaks, Wren managed to continue the upper cornice from end to end and to replace the usual order by a recessed treatment in which the arched windows are inserted. Contrast is secured by the scale of the three large entrances in the basement story and the string of smaller squared windows between the door openings, the vertical sequence being accented by the breaks in the pedestals of the balustrade marking the roof.

The interior of the Library is superb, for it is at once simple, logical and true. It is not only the finest study room in England, but a direct statement of the culture of the age that produced it. Wren followed the traditional custom of placing bookcases at right angles to the light, the spaces between the stacks being reserved for study. In Wren's time the ceiling was left plain, but in the middle of the last century reference to a plan he had prepared for a trabeated ceiling caused the authorities to include its execution in the scheme of renovation.

SIR CHRISTOPHER WREN

From first to last Wren's interest in architecture remained unabated. Throughout his long career Wren spared no effort to perfect himself in design and construction. Endowed with rare taste, moving in the highest circles, sympathetic with every influence that came from abroad relating to art, he rose from the experimental stage to the status of a great master. From the outset he was a designer and a contriver, he possessed the power, no uncommon gift, of designing his buildings in space; not the facility of the visionary for aërial castle building, but the quickened imagination of the artist who could conceive a building *in toto* without the aid of plans, elevations or perspectives. Wren's brain overflowed with ideas. When conditions were not explicitly stated, as is often the case to-day, Wren came to the aid of those interested in the scheme and recast their requirements in proper order. By nature he was a serious man, almost as grave in his way as Evelyn. He had a strong sense of fitness, and this militated against his undoubted aptitude for licensed spontaneity. He was, however, as incapable of designing the scenery for a masque as Inigo Jones would have been of scheming the intricate construction of the Dome of St. Paul's. But he indubitably possessed spontaneity, as the great pylons to the Lion Gateway at Hampton Court show. And no compliment more sincere could be paid to his genius as an exponent of the baroque spirit than praise of the magnificent woodwork to the Choir stalls of St. Paul's. With the coming of the Hanoverians it was inevitable that Wren should go out of fashion. He and his school belonged to the old régime of the Stuarts, with whom the clumsy Germans had nothing in common. The age of Charles the Second and Louis the Fourteenth had passed, the

old rivalry of Courts was giving place to political dictatorship and the rise of the commercial classes. What right had an old man, worn out in the service of his country, to assert his opinions against the Bensons and the Colin Campbells ?

Sir Christopher Wren was an individualist, a giant among pigmies, and not the least of the forces that lent lustre to modern England of the eighteenth and nineteenth centuries. Since Wren's death coterie after coterie has entered upon the heritage of the English tradition ; there have been slavish imitations of this or that school, there have been attempts to reduce architecture to systems unheard of in the Classic age, but the differences in spite of all the erudition have been solely those of surface. Wren inherited the secret of masculinity from Inigo Jones and tempered it with his own humanity. His was the mind that gave impetus to architecture at a crisis in the national affairs, and definition to the slow change from mediæval to modern. To his untiring exertions we owe all that is vital in modern English building. Those who succeeded him could not uproot the parent tree which he had tended. A century ago the buildings of Wren formed the chief theme of contemporary guide-books. Thirty years later there were signs of an incipient Wren revival in which Cockerell took part. Thirty years after that we come to the time when architectural taste, the true forerunner of public opinion, turned to a close study of Wren's buildings. The attitude to-day towards the designs of the master is one of appreciation for the abstract qualities displayed. We may not be dazzled by the adventitious character of the ornament which in the passing of years has lost its symbolism ; the viewpoint has entirely changed. New ideas are current regarding planning and con-

struction. There is in addition, the completed picture of architectural achievement of all countries and of all ages to be studied. The present is a period of adventurous eclecticism, when stylishness rather than style is pursued; an age of experimental construction calling for concentration and skill which no summary of architectural idioms can assist.

Wren soon came to realise the abstract qualities of architecture as a fine art, his perception as a scientist revealed to him the true intent and purpose of form as well as the limitations. He saw in the intangible spirit of architecture illimitable possibilities beyond the reach of scientific knowledge, yet in accord with the aspirations of mankind. The power to invent and to conceive largely was Wren's chief gift. His humanity directed him to give expression and articulation to inert masses of material, and to impart comfort, happiness and well-being to his fellows and posterity.

The Custom House. From an engraving in 1714 by John Harris.

SIR CHRISTOPHER WREN AND HIS PLAN FOR LONDON. *By S. D. Adshead, M.A., F.R.I.B.A., Professor of Town Planning, University of London.*

OF the many successful works of Sir Christopher Wren, perhaps none affords so striking an example of the versatility of his talents as his plan for the rebuilding of London.

To trace minutely the course of Wren's life, or even to follow the course of his professional career, is not the object of this short essay, but fully to appreciate the circumstances under which his great plan for London was initiated it is necessary first of all at least to glance at the character and training of the great man who produced it.

With an intellect that comprehended so much, ideals so lofty, and interests so varied, he is difficult to understand. He was possibly too brilliant a success, too versatile, and altogether too much the man of affairs to be correctly described as a genius, yet at the same time he was something more, for in every phase of his career he seems to have stood higher than his compeers.

In these days of specialisation it is good to find a man with such varying interests and accomplishments enthusiastically engaged in the making of a city plan,

and it is good to note that whilst he takes cognisance of street widths, heights of buildings, the convenient location and shape of sites for buildings, the zoning of industries, the requirements of sanitation and the prevention of noise and smell, he regards at the same time as of equal, if not greater, importance, the skilful treatment of vistas, the shaping of open spaces, and the solving of those subtle and very technical problems which we associate with what he himself describes as the liberal arts.

As a man, Wren must have been as astute as he was straightforward. To most of his associates he must have appeared as a simple and an honest fellow, but it is obvious, as Pepys' references to him show, that he was as alive to every Court intrigue in which his position placed him as he was clever in avoiding being made the dupe of less intelligent, though more cunning, men.

Pepys says: "Mr. Wren hath refused a present of Mr. Wilson's for his place of Store-keeper at Chatham, and is resolved never to take anything, which is both wise in him and good to the King's service"; and again, "In the Park, when I met Mr. Wren; and he and I walked together to the Pell Mell, it being most summer weather that ever was seen. And we talked of several things; of the corruption of the Court, and how unfit it is for ingenious men, and himself particularly, to live in it, when a man cannot live, but he must spend, and cannot get suitably without breach of his honour: and he did thereupon tell me of the basest things of my Lord Berkeley that ever was heard of any man—which was this: . . ."

Pepys was evidently a great confidant of Wren, and he knew as a clever man of the world to whom he could entrust a secret and upon whom he could rely.

But how came he to acquire the special qualifications necessary to undertake so important a commission as that of carrying out the replanning of London and the actual execution of all the important buildings that were to figure on the plan? How came he to acquire his great knowledge of architecture? He is an example of a man who, having received a liberal education in both the departments of Arts and Science (for, as well as being Savilian Professor of Astronomy at Oxford, he was possessed of considerable attainments as a Classical scholar), turned to architecture at a comparatively late period in his career.

At the age of twenty-nine he was summoned from Oxford by the King to undertake in conjunction with John Denham certain public works contemplated by His Majesty. For two years he practically did nothing but prepare designs, and his later appointment in 1663 to complete the Cathedral Church of St. Paul's only resulted in a further period of hopeless endeavour to get carried out alternatively ambitious schemes.

No doubt the five years which intervened between 1661 and 1666 were very valuable to Wren, and we must regard this period, at the conclusion of which he made a prolonged visit to France, as having afforded him the best possible education as an architect that a man of his originality could receive.

This period, 1661–6, had not, however, been entirely one of preparation, for his associations with Oxford University had enabled him to obtain the commission for building the Sheldonian Theatre. This building, commenced in 1663, when Wren was thirty-one years of age, was completed in 1669. About this time he also designed and carried to completion Trinity

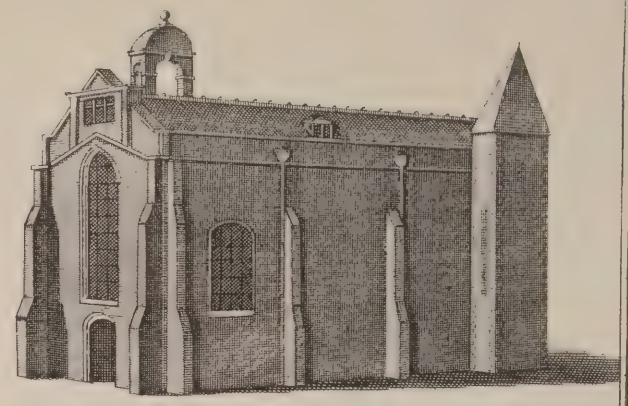
College, Cambridge, and the Quadrangle, called Neville's Court, also the less important works of the Chapels of Pembroke and Emmanuel Colleges. All this University work, however, proceeded slowly, and compared with his later works shows that he was directly influenced by the work of his predecessor, Inigo Jones, and by such Palladian architecture to the illustration of which he would at the time have access.

His later works certainly show the influence of his travels in France; they exhibit a freedom in the disposal of orders and features entirely absent in his Trinity College Library, Cambridge, and also not seen in the Palladian architecture of Italy erected before his time. He was always original, and in one of his letters, giving expression to his views on architectural design whilst advocating a reverence for the great traditions of the past, he at the same time speaks disparagingly of those who are so traditionally hidebound as not to have the courage to originate anything new. His mind was ever at work adapting existing elements to newer conditions. Like the great mathematician that he was, his thoughts ran on the relation of ideas rather than on the intrinsic value of the ideas themselves.

This state of Wren's mind is well shown in his "Discourse on Architecture" preserved in "Parentalia." Here, describing the architecture of the Egyptians, he is at great pains to explain by a simple and logical process of reasoning how the building of the Pyramids to that particular shape with cube blocks of granite may be attributed to the opulence of the people and the fertility of the valley of the Nile, vast numbers of well-fed people being kept employed in the unskilled work of quarrying, dressing and setting standardised stones.

Such then was the man who, when the Great Fire

The Parish Church of
S.t Trinity in the Minories.



The Chapel of the Rolls.

Scale of Paces 3 Pol.
80 160 240 320 400 480

Turn Mill Street
Holborn
West Smith Field
Moore Fields
Spittle Fields
Strand
East Smith Field
Thames
River
South wark

1 Temple Barr
2 Fleet Conduit
3 S.t Dunstans in the West
4 Seargeants Inn
5 The New Channel
6 The Colledge of Physicians
7 Doctors Commons
8 S.t Pauls
9 / 10 The two Sheriffs of London Houses
11 Mercers Chapel
12 Bow Church and the Arches
13 The Fountain in Grace Church Street
14 S.t Dunstans in the East
15 Guild Hall
16 Christ Hospital and Church
17 My L.d Mayors Howse
18 The Royal Exchange
19 The Trinity House
20 The Custom House & Admiralty Court
21 The Navy Office
22 Belings Gate

23 The Fish Market
24 Queen Hyth
25 Pauls Wharf
26 The Sluce
27 Sessions House, Newgate Prison,
Publick Work House, & Bridewell.
28 The Church Yards & Inns
29 The Key
30 Black Friers Church & Watling Street
31 The Tower
32 New Gate
33 Alders Gate
34 Cripple Gate
35 Moore Gate
36 Bishops Gate
37 Ald Gate
38 Charles Gate
† The several Parish Churches 20 in N.o
* The Halls of the 12 Antient Companies
○ The Publick Fountains

The rest of the openings are for the Markets &c. And in the intermedial
Squares & Area's, what narrower Streets shall be thought Fit.

S.r J. Evelyn delin

B. Cole Sculp.t

London Restored Or SIR IOHN EVELYN'S Plan for Rebuilding that Antient Metropolis after the Fire in 1666.

THE WARDS of FARINGTON within and BAYNARDS CASTLE with its Divisions into Parishes taken from the last Survey, with Corrections

A Table of References to this Mapp

FARINGTON WARD

1. St Austins church
2. Crane Court
3. Lamb Alley
4. three Daggers Coll
5. Green Dragon court
6. Swan Alley
7. Shepheards court
8. St Mathew Fryday St
9. St Peters Cheap church
10. Dayes Court
11. Kings head court
12. Dove Court
13. Stone Court
14. Inholders Hall
15. Kerry Lane
16. Castle Tavern
17. Eagle & child court
18. Kings head court
19. three Cup Court
20. Swan Alley
21. Petty Canons Alley
22. Petty Canons Court
23. Pauls Alley
24. Sun Court
25. Crown Court
26. Crown Inn
27. Oxford Armes Inn
28. Phenix Court
29. Colledg of Physitians
30. St Martins Ludgate
31. Sambrook court
32. Cobs Court
33. Flower delis court
34. St Anns blackfryers
35. Cloyster Court
36. Swan Alley
37. Canterbury court
38. Jacsons Court
39. Hughs Court
40. Appothecaryes Hall
41. Peacock Alley

BAYNARDS CASTLE WARD.

42. Crown Inn
43. Bell Inn
44. White Hart Street
45. Mearmaid alley
46. St Pauls Colledge
47. Scallop Court
48. Dean of Pauls house
49. St Joseph Sheldons
50. Kings head Court
51. Red Lyon Court
52. Crown Court
53. Sarazens head Inn
54. Blackhorse Court
55. Kings head Inn
56. St Mary Magdalens church
57. Crane Court
58. St Mary Magdalens church yard
59. Green Dragon Court
60. Blacksmiths hall
61. Robin hood court
62. Black boy alley
63. Embroiderers Almes house
64. St Benets Pauls wharfe
65. Helmet Court
66. White Horse Court
67. White Bear Court
68. Crown Court
69. Great Rutland Court
70. Pauls Back house
71. Maiden head Inn
72. Mearmaid Inn
73. Dunghill Lane
74. Printing house street
75. Black swan Court
76. Flon de luce Court
77. Morris' Wharf
78. Chapter House

From Stows' Survey, by Richard Bloome, 1720.

of London devastated an area of about a square mile of the most valuable building sites in England, was commissioned by the King to prepare not only a plan for the lay-out of a new city, but also to design and superintend the carrying out of all its buildings.

London before the Fire might be likened to such mediæval cities as Norwich. Within it were some 600,000 souls densely packed in tall wooden structures overhanging narrow streets of uncertain direction. Beyond the gates as large an area was covered with buildings along the Strand and Holborn, and in the direction of Westminster there were the palaces of the nobility and the residences of the retired bourgeois. There had also been considerable building east of the City, beyond Houndsditch along the Whitechapel Road and in the north towards Tottenham.

The great radial roads entering the City, that would have to receive first consideration in the making of the plan, were, therefore, London Bridge, the Whitechapel Road, the Cambridge Road, Holborn and the Strand. And important sites that would have to be regarded as demanding preservation would be, the site of the Exchange, of the Guildhall and of St. Paul's.

On March 6, 1666, Wren was made Surveyor-General and principal architect for rebuilding the whole of the City, the Cathedral Church of St. Paul's and all the parochial churches (fifty-one in number), with other public structures, and for the disposition of the streets. The work was so great and extensive as to encumber a single person, and he was disposed to take to his assistance Mr. Robert Hooke, Professor of Geometry at Gresham College, to whom he assigned the work of measuring, adjusting and setting out the ground of the private streets and houses to the several proprietors,

reserving all the public works to his own particular care and direction.

The King on September 13 issued a Royal Proclamation forbidding building until orders for the new City could be prepared.

Although commissioned by the King to prepare a new plan, it must not be supposed that Wren's scheme was the only one that was made or that called for public notice and recognition His friend, John Evelyn, man of affairs and art connoisseur, also prepared a scheme, and less important plans were also put forward by his assistant, Robert Hooke, and also by Valentine Knight.

The scheme of Wren's is, perhaps, best described in his own report, which he presented to the King together with his plan. He says: "From the part of Fleet Street which remained unburned, about St. Dunstan's Church, a straight street of 90 feet wide crosses the Valley, passing by the South side of Ludgate Prison, and then in a direct line ends gracefully in a Piazza at Tower Hill; but before it descends into the Valley where the great sewer (Fleet ditch) runs, about the middle of Fleet Street, it opens into a round Piazza, the centre of eight ways. First, straight forward through the City; Second, obliquely towards the right hand to the beginning of the key that runs from Bridewell Dock to the Tower; Third, obliquely to the left to Smithfield; Fourth, straight on the right to the Thames; Fifth, straight on the left to Hatton Street and Clerkenwell; Sixth, straight backwards towards Temple Bar; Seventh, obliquely on the right to the walks of the Temple; and Eighth, obliquely on the left to Cursitor's Alley.

"Passing forward, we cross the valley, once sullied with an opened sewer, now to be beautiful with a useful canal, passable by as many bridges as streets that cross it.

"Leaving Ludgate Prison on the left side of the street (instead of which a gate was designed as a Triumphal Arch to the Founder of the new City, King Charles the Second), this great street presently divides into another as large, which carries the eye and passage to the South-front of the Exchange (which we leave as yet for a second journey), and before these two streets spreading at acute angles can be clear of one another. This forms a triangular Piazza, the basis of which is filled by the Cathedral Church of St. Paul. But leaving St. Paul's on the left we proceed as our first way led us towards the Tower, the way being all along adorned with Parochial Churches.

"We return again to Ludgate, and leaving St. Paul's on the right hand pass the other great Branch of the Royal Exchange seated in the place where it was before, but free from buildings in the middle of the Piazza included between two great streets, the one from Ludgate leading to the South front, and another from Holborn, over the Canal to Newgate, and then straight to the North front of the Exchange."

Thus Wren describes his own plan, and what one particularly notes about the description is the sense of location he possessed, and the way in which he leads us through, rather than explains, its ramifications. It is also to be noted that he everywhere hints at the scenic beauty of the façades and other features that would everywhere meet the eye. But still more light is shed on the meaning and intention of the plan in a description in "Parentalia," which reads as follows :

> "In order, therefore, to a proper Reformation, Dr. Wren (persuant of the Royal Commands) immediately after the fire took an exact survey of

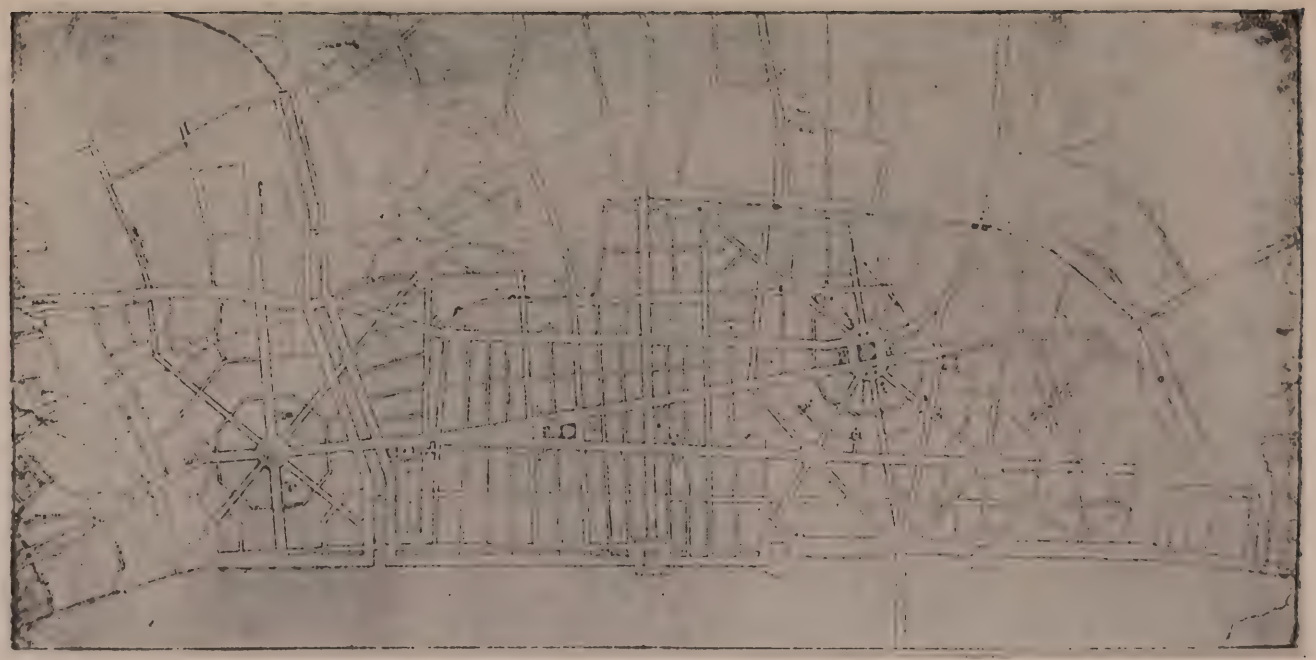
the whole Area and Confines of the Burning, having traced over, with great trouble and Hazard the great Plain of Ashes and Ruins; and designed a Plan or Model of a new City, in which the Deformity and Inconvenience of the old Town were remedied, by the enlarging the Streets and Lanes, and carrying them as near parallel to one another as might be; avoiding, if compatible with greater Conveniences, all acute Angles; by seating all the parochial Churches, conspicuous and insular; by forming the most Publick Places into large Piazzas, the Centre of eight Ways, by uniting the Halls of the twelve chief Companies into one regular Square annexed to Guildhall, by making a commodious key on the whole Bank of the River from Blackfriars to the Tower.

"Moreover, in contriving the general Plan the following Particulars were chiefly considered and prepared,

"The Streets to be of three Magnitudes, the three principal leading straight through the City and one or two Cross Streets to be at least 90 Feet wide; others 60 Feet and Lanes about 30 Feet, excluding all narrow dark alleys without Thoroughfares and Courts.

"The Exchange to stand free in the middle of the Piazza, and be, as it were, the Nave, or Centre of the Town, from whence the 60 Feet Streets as so many Rays should proceed to all principal parts of the City. The Buildings to be contrived after the form of the Roman Forum with double Porticos. Many Streets also to radiate upon the Bridges.

"The Streets of the first and second Magnitude, to be carried on as straight as possible, and to centre



Sir Christopher Wren's Final Plan for Rebuilding the City of London, 1666. From his original Drawing.

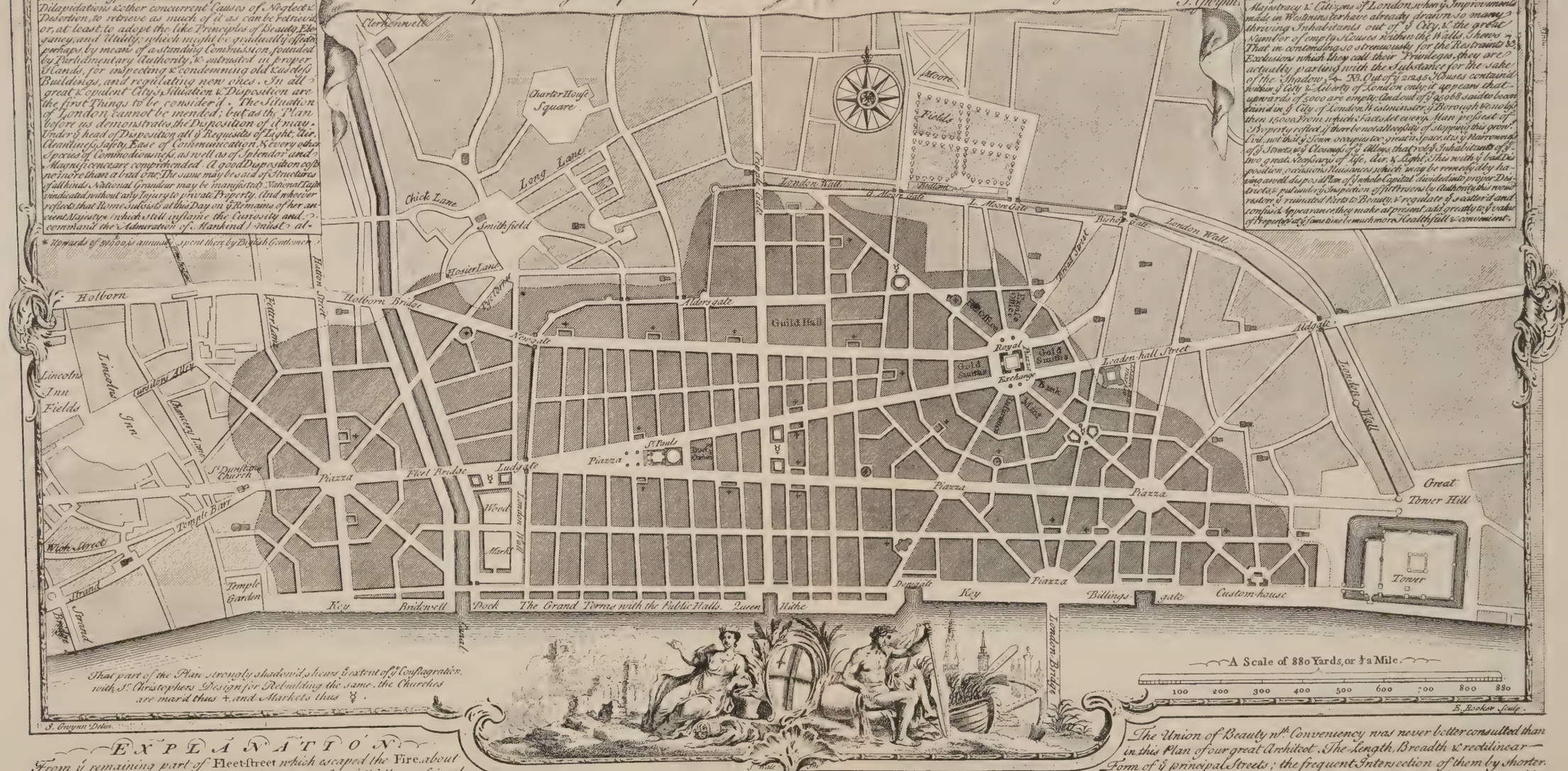
A PLAN FOR REBUILDING THE CITY OF LONDON, AFTER THE GREAT FIRE IN 1666; DESIGN'D BY THAT GREAT ARCHITECT Sr CHRISTOPHER WREN; AND APPROV'D OF BY KING AND PARLIAMENT, BUT UNHAPPILY DEFEATED BY FACTION.

As the Non-execution of this noble Plan must be regretted by all those who cannot help wishing, That a proper Advantage was made of every Opportunity which the accidental Losses, or which arises from unavoidable Dilapidations & other concurrent Causes of Neglect & Desertion, to retrieve as much of it as can be retrieved, or, at least, to adopt the like Principles of Beauty, Elegancy, and Utility, which might be gradually effected perhaps, by means of a standing Commission, founded by Parliamentary Authority, & entrusted in proper Hands, for inspecting & condemning old & useless Buildings, and regulating new ones. In all great & opulent Citys, Situation & Disposition are the first Things to be considered. The Situation of London cannot be mended, but as the Plan before us demonstrates, the Disposition of it may. Under y head of Disposition all y Requisits of Light, Air, Cleanliness, Safety, Ease of Communication, & every other Species of Commodiousness, as well as of Splendor and Magnificence are comprehended. A good Disposition cost no more than a bad one. The same may be said of Structures of all kinds. National Grandeur may be manifested, National Right vindicated, without any Injury to private Property. And whoever reflects that Rome subsists at this Day on y Remains of her ancient Majesty, which still inflame the Curiosity and command the Admiration of Mankind, must al-

To the Consideration of ye R^t Honble ye Lord Mayor, ye Court of Aldermen, & Common Council of ye City of London, this Plan, reduced from the Original of Sr Christopher Wren, is with all Submission, inscribid, by their most hum. Servant J. Gwynn.

low that it would not be y worse for our Posterity, if we regarded y Public more, & our own little, paltry Schimes and Devices less: which is, at this time, more particularly worthy the Consideration of the Majestracy & Citizens of London, when y Improvements made in Westminster have already drawn so many, & threwing Inhabitants out of y City, & the great Number of empty Houses within the Walls, shows. That in contending so strenuously for the Restraint & Exclusions which they call their Privileges, they are actually parting with the Substance for the Sake of the Shadow. NB. Out of ye 21845 Houses contain'd within y City & Liberty of London only it appears that upwards of 5000 are empty. And out of ye 9968 said to be contain'd in y City of London, Westminster, y Borough &c no less then 1500 From which Facts let every Man perfect of Property reflect if there be not at least Possibly of stopping this growl Evil, not that y Town occupies too great a Space, its y Narrowness of y Streets, y Closeness of y Alleys, that ye y Inhabitants of ye two great Necessarys of Life, Air, & Light. This with y bad Disposition, occasions Nuisances which may be remedyd by having a well dispos'd Plan of y whole Capital divided into proper Districts, & put under y Inspection of fit Persons by Authority, this would restore & ruminated Parts to Beauty, & regulate y scatter'd and confused Appearance they make at present, add greatly to y value of Property, & sometime be much more Healthfull & convenient.

* Upwards of 91000 £ annually spent there by English Gentlemen.



EXPLANATION.

From y remaining part of Fleet-street *which escaped the Fire, about* St Dunstan's Church, *a streight & wide Street crosses y Valley, passing by the North side of* Ludgate Prison, *& thence in a direct Line thro y whole City terminats at* Tower Hill; *but before it descends into y Valley where y Great Sewer runs, it opens into a Round Piazza, y Center of Eight Ways, where at one station we see [I] streight forward quite thro y City; [II] Obliquely towards y right hand, to y beginning of y* Key, *that runs from* Bridewell Dock *to y* Tower; *[III] Obliquely on the Left to* Smithfield: *[IV] streight on y Right to the* Thames. *[V] Streight on the Left to* Hatton Street *and* Clerkenwell: *[VI] streight backwards towards* Temple Barr: *[VII] Oblique-ly on y Right to y* Temple Garden: *[VIII] Obliquely on y Left to* Curstors Alley. *Passing forward we cross y Valley, once sullied wth an offensive Sewer, now beautified with a useful Canal, wth Wharfs on each side, passable by as many Bridges as Streets that cross it. Leaving* Ludgate, *this great Street presently declines gradually on either side, till it Branches into two equally large. But before these two Streets, spreading at Acute Angles, can be clear of one another they form a Triangular, Piazza, y Basis of which is filled by y* Cathedral Church of St Paul. *Leaving* St Pauls *on y Left we proceed (as our first way leads us) towards the* Tower. *We return again to* Ludgate, *and leaving on y Left we proceed (as our first way leads us) towards the* Tower. *We return again to* Ludgate, *and leaving* St Pauls *on the Right hand, pass along the other great Branch to the* Royal Exchange, *Seated in y Place where it was but since Building, in y middle of a Grand Piazza, Surrounded by y Public Offices, & included between Two great Streets. One from* Ludgate *leading to y South Front, & another from* Holborn *over y Canal to* Newgate, *& thence streight to y North Front &c. The Bridge opens in a demicircular Piazza, wth 4 Streets leading to y several parts of y City. Every Gate would terminate y Street wth y appearance of a Triumphal Arch, & a most Magnificent one was Design'd in y room of* Ludgate *in Memory of ye Royal Founder King* Charles *y* Second.

Streets, included also betwixt right Lines, & for y most part ending in right Angles; the Position of y Churches & other public Edifices at proper Distances, in y most advantageous points of View, & detach'd from y private Dwellings; y noble Terras, that was to serve as a Bank to y Thames, & y spacious & regular Key, faced wth the Halls of all the City Companies, that would at once have adorn'd and enrich'd the shore of that River, the Central Piazzas, round or polygon, in parts of y greatest Resort, & the Streets pointing from them like Radii towards the several remote Quarters of the City; these are all Advantages that must at the first Glance strike every curious Eye, & compel every person of Taste to admire the Skill of the Designer, and regret the irreparable Neglect of his Design. Let us consider that he was not planning a New City, where he might be entire Master of his Ground, but contriving to Rebuild an Old One within such an irregular Line as the Fire had left for his Boundary; and we must be obligd to confess that scarce could any thing more perfect be imagined, than this Schnography of Sr Christopher, which was entirely defeated by narrow spirited Contests about identical Property and perhaps the Want of sufficient Resolution in the Commissioners, tho' their Decisions were arm'd with parliamentary Sanction. To say all in few Words; An absolute Defect of Judgement and Taste, which prevailed in the Reign of K. Charles II. was the sole Cause that the largest and most opulent City in Europe, is now destitute of all regular Beauty.

The Union of Beauty wth Convenience was never better consulted than in this Plan of four great Architect. The Length, Breadth & rectilinear Form of y principal Streets; the frequent Intersection of them by shorter Colsties at proper Distances, in y most advantageous points of View, & detach'd from y private Dwellings; y noble Terras, that was to serve as a Bank to y Thames, & y spacious & regular Key, faced wth the Halls of all the City Companies, that would at once have adorn'd and enrich'd the shore of that River, the Central Piazzas, round or polygon, in parts of y greatest Resort, & the Streets pointing from them like Radii towards the several remote Quarters of the City; these are all Advantages that must at the first Glance strike every curious Eye, & compel every person of Taste to admire the Skill of the Designer, and regret the irreparable Neglect of his Design. Let us consider that he was not planning a New City, where he might be entire Master of his Ground, but contriving to Rebuild an Old One within such an irregular Line as the Fire had left for his Boundary; and we must be obligd to confess that scarce could any thing more perfect be imagined, than this Schnography of Sr Christopher, which was entirely defeated by narrow spirited Contests about identical Property and perhaps the Want of sufficient Resolution in the Commissioners, tho' their Decisions were arm'd with parliamentary Sanction. To say all in few Words; An absolute Defect of Judgement and Taste, which prevailed in the Reign of K. Charles II. was the sole Cause that the largest and most opulent City in Europe, is now destitute of all regular Beauty.

Published October 3^d 1749 & Sold by the Proprietors at Palladio's Head in Long Acre. Price One Shilling.

Wren's Plan of London as reproduced by J. Gwynn.

into four or five Piazzas. The key or open wharf on the bank of the Thames to be spaceous and convenient, without any Interruptions, with some large docks for barges deep laden.

" The Canal to be cut up Bridewell 120 feet wide, with saffes at Holborn Bridge, and at the Mouth to cleanse it of all Filth, and Stores for coal on each side.

" The Churches to be designed according to the best Forms for Capacity and Hearing, adorned with useful Porticos and lofty ornamental Towers and Steeples in the great Parishes. All Church yards, Gardens and unnecessary vacuities, and all trades that use great Fires, or yield noisome Smells to be placed out of the Town."

" Parentalia " states further :

" The Practicability of the whole Scheme without loss to any man, or Infringement of any Property, was at that time demonstrated, and all material objections fully weighed and answered ; the only, and as it happened, insurmountable difficulty remaining, was the obstinate averseness of great part of the Citizens to alter the old Properties and to receed from building their Houses again on the old ground and Foundations, as also the distrust in many, and unwillingness to give up their Properties, though for a time only, into the hands of Publick Trustees, or Commissioners, till they might be Dispensed to them again with more advantage to themselves than otherwise was possible to be effected ; for such a method was proposed that by an equal distribution of ground into Buildings, leaving out Church yards, Gardens, etc. (which were to be

removed out of the Town), there would have been sufficient room both for the Augmentation of the Street, Disposition of the Churches, Halls and all Public Buildings, and to have given every proprietor full Satisfaction, and although few Proprietors should happen to have been seated again, directly upon the very same Ground they had possessed before the Fire, yet no man would have been thrust any considerable distance from it, but been placed at least as conveniently, and sometimes more so, to their own Trades, than before.

"By these means the opportunity was lost of making the new City the most magnificent, as well as Commodious for Health and Trade, of any on Earth: and the Surveyor being thus confined and cramped in his design, it required no small labour and skill to model the City in the manner it has since appeared."

It is interesting further to quote an extract from a critical review of the Buildings of London, published in 1734, which says:

"The Fire of London furnished the most proper occasion that can ever happen to any City to rebuild it with Pomp and regularity; this Wren foresaw, and as we are told offered a scheme for that purpose which would have made it the wonder of the World. He proposed to have laid out one large street from Aldgate to Temple Bar, in the middle of which was to have been a large square capable of containing the new Church of St. Paul's, with a proper distance of the view all round it; whereby that huge building would not have been cooped up,

> as it is at present, in such a manner as nowhere to be seen to advantage at all, but would have had a long and ample vista at each end to have reconciled it to a proper Point of View and given it one great Benefit, which in all probability it must now want for ever. He further proposed to rebuild all the Parish Churches, in such manner as to be seen at the end of every vista of houses, and disposed in such distances from each other, as to appear neither too thick, nor thin in Prospect; but give a proper heightening to the whole Bulk of the City as it filled the Landscape. Lastly, he proposed to build all the Houses Uniform, and supported on a Piazza, like that of Covent Garden, and by the water side, from the Bridge to the Temple he had planned a long and broad Wharf or Key, where he designed to have ranged all the Halls that belong to the several Companies of the City, with proper Warehouses for Merchants between to vary the Edifices, and make it at once, one of the most beautiful, and most useful ranges of structures in the World.
>
> "But the hurry of re-building and the disputes about property, prevented this glorious scheme from taking place."

These are interesting comments which, read in conjunction with the comments of James Gwynn, which appear on the border of his plan published in 1749, and reproduced with this article, show the appreciation held by the cultured few in the eighteenth century of Wren's plan (see fold-in Plan facing p. 168).

Regarding the problem in the light of present-day knowledge, it is easy to understand how the weight

of an increasingly powerful democracy overthrew so gigantic a scheme. The same unconquerable difficulties have occurred in connection with the rebuilding of towns and villages in France. Since the War, men of little imagination inherently cling to that which they are accustomed to, and to that which they feel they can call their own.

The merits of Wren's plan are the more fully appreciated when it is compared with that of John Evelyn. Whereas Evelyn commences with pattern making, Wren builds up his plan on a foundation of social and commercial conditions, and devotes his architectural genius to knitting a hundred such problems into an architectural whole.

His treatment of his St. Paul's Piazza would have provided a striking approach to the great Cathedral, suggesting the passing to and fro from all parts of the City of a great concourse of people. He wisely at the same time continues parallel with the river that oldest of thoroughfares, the Strand.

He realised the importance of Holborn, and, by a clever combination of ways, makes his two greatest thoroughfares pass his civic centre, the Royal Exchange. If there is a defect in the skeleton of the scheme, it is, perhaps, in the narrowness of the approach to the Exchange from London Bridge, but it should be noted that of the four ways which emerge from this entrance to London each provides a direct route across the City to the several gateways on the North and East side as well as equally dispersing the traffic from the South side of the Thames over the whole area of the City.

In his conversion of traffic intersections into important architectural "places," he is exceedingly economical, reserving such features only for the more

important occasions. His Royal Exchange Piazza takes an exceedingly interesting shape, for whilst it forms a splendid intersection for main thoroughfares and a site for a most important building, at the same time it complies with all the requirements of design as regards main thoroughfares, in that it in no way offers any obstruction as traffic passes along. It is to be noticed that nowhere does Wren obstruct a main thoroughfare, yet somehow all his churches and public buildings find sites at the termination of vistas.

Much could be written of the less important features of the plan, but space will only permit of a comment being made in one or two cases. Of particular interest is the way in which he treats, with perfect symmetry, an unsymmetrical junction of streets south-east of the Royal Exchange. A further point of interest is the way in which he divides Broad Street, so as to provide a bye-pass road to Aldersgate and Newgate without passing the Royal Exchange—a point evidently overlooked by Gwynn.

Evelyn's plan is obviously the work of an amateur. It possesses none of the technical subtleties which everywhere appear on the plan of Wren. His Newgate Street misses his civic centre, as also does his main street through Aldgate from Whitechapel. He is unable to reconcile his main street behind the river, which terminates at both ends nowhere, with his radial road from the London Bridge approach. He has far too many very awkward flat-iron sites in important thoroughfares, and the shapes of his street intersections show his utter helplessness in attempting to cope with problems of this kind.

The plan of Robert Hooke was entirely of the gridiron type. We are unaware whether he produced

this plan before being called in by Wren to assist him with the survey and to deal with matters of compensation.

Valentine Knight's plan is only of interest in so far as it was a proposal for constructing a navigable canal with an entrance from the Thames at Billingsgate, thence going north into the City, at Fenchurch Street, and turning west in Lothbury and through the wall above Aldersgate to join the Fleet River, and so back to the Thames.

I desire to acknowledge my indebtedness to Mr. Sydney Perks for information contained in the paper which he read before the Royal Institute of British Architects on December 15, 1919, and published in the Institute Journal.

DUTCH INFLUENCE ON THE ARCHITECTURE OF SIR CHRISTOPHER WREN. *By Arthur Stratton, F.R.I.B.A., F.S.A., Reader in Architecture, London University.*

THE personality of Sir Christopher Wren permeates every known architectural work with which his name is associated. The essentially human touch he imparted to everything that took shape under his guidance no less compels sympathetic acceptance of his attitude towards the building arts than his straightforward methods appeal to the dictates of common sense. Giant that he was, nothing diverted him from the road along which he travelled, while nothing escaped him that could contribute to the easy attainment of the ends he had in view. Turning now towards Italy, now towards France, and ever watchful of developments in Holland and the Low Countries, he was always ready to learn what the architects of these and other lands had to teach, but never at the sacrifice of his own individuality or at the cost of pursuing an ideal that was not his own. He adopted the profession of architecture at a time when the most pressing need was the settling of a national style.

There is abundant evidence that Wren accepted much from contemporary and earlier achievement in foreign countries. In no other way can the wide range of design covered by his public, ecclesiastic, and domestic buildings be explained. But to determine exactly how much he derived from foreign sources, and by what means they were laid under contribution, would now be an almost impossible task. In dealing with a man of such extraordinarily versatile powers, any light that can be thrown upon his achievements should be acceptable, even if it does not altogether illumine the obscurity in which some of them are wrapt. Right lines of investigation pursued in the right spirit may some day reveal secrets of inestimable worth to architects as explaining a procedure which makes for largeness of conception, breadth of vision, and escape from the trivialities of insular prejudices.

It must be remembered that Sir Christopher Wren made but one architectural tour on the Continent, and that was to Paris and the neighbourhood in 1665–6. He could never be spared again. Much as he must have longed to see the works of the great architects of the Renaissance in Italy—with which he was familiar from prints and from accounts given to him by those who had seen them—he was never able to visit them himself. Certain it is that Wren was never in Holland, and yet the Dutch influence upon a wide range of his executed work is undoubted. Of the various foreign influences—notably Italian, French, and Dutch—which proclaim themselves in his work, the last shows especially in his civic and domestic buildings: it was through these that the Dutch influence long asserted itself in a vernacular style peculiarly suited to the English climate, temperament and social outlook.

SIR CHRISTOPHER WREN

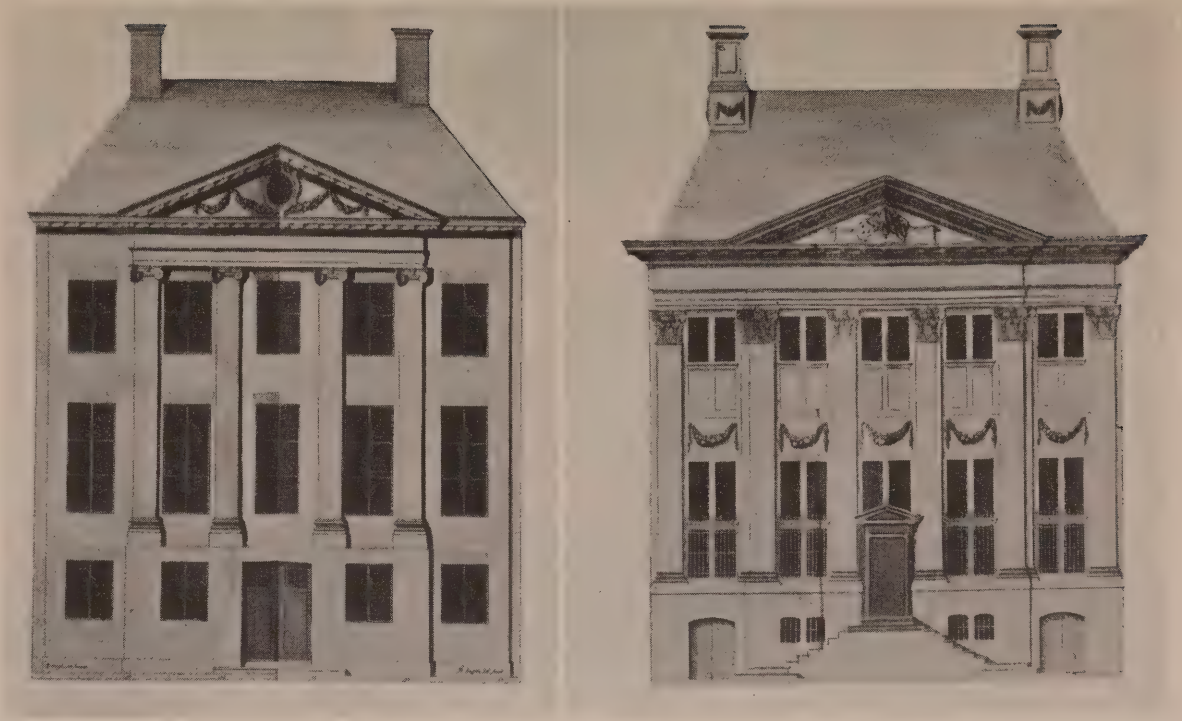
The study of the history of architecture reveals the fact that all sound and lasting developments have been based on precedent. This is no less true of the architecture of England than of that of other countries. It is no disparagement to the inventiveness of Wren to lay bare some of the sources whence he drew inspiration, but indeed a tribute to his scholarship, to his powers of selection and to his masterly reliance upon precedent which are the indispensable qualifications of a great architect. Without them he could no more have built up a tradition which established English architecture on sound lines through a century of progress than Inigo Jones could have cast aside the inconsistencies prevalent in his day, when he reared in Whitehall a building that had no counterpart in this country.

The influence of the printed book and the published drawing has been far reaching in England, but perhaps never with such beneficial results as in the latter part of the seventeenth century. French, Italian and Dutch folios were finding their way here in ever-increasing numbers, and the shelves of architects' workrooms must have been lined with them. To what uses they were put is apparent: all we owe to them is not sufficiently recognised.

The architecture of Great Britain has always been susceptible to foreign influences. Evidence of this is unmistakable through the centuries, and from the varied flow of ideas affecting the building arts which reached us from time to time, coming from the continent of Europe through widely different channels, resulted the wonderful British tradition which makes this country second to none in wealth of historical buildings. For although the impetus to depart from a native development can invariably be traced to foreign sources, it is

characteristic of the British temperament that new influences were so welded into the traditional manner of any particular period that without exception they took on a British aspect and soon ceased to proclaim their foreign origin. The resulting phase was national and as unlike its prototype as were the intellectual outlooks of the different races concerned, or the climatic conditions of the countries from which inspiration was drawn. Of the various foreign influences which have been brought to bear upon British architecture, none has been more persistent than the Dutch. Yet while the French, the Italian, the German, and, in its later phases, the ancient Classic influences have been recognised, writers on the development of Renaissance architecture in this country have been content to label a façade here and the interior decoration of a room there as Dutch, without probing it to its source, except in the case of a few buildings of outstanding importance; such as Gresham's Royal Exchange and "Britain's Burse." In such instances the explanation is not difficult, given conditions which permitted such interchange of thought, sentiment and building ideals as could lead the citizens of London to erect buildings which had their close counterpart in Antwerp or Amsterdam.

To understand how our architecture could reflect actual Dutch masterpieces in the time of Elizabeth and continue to draw inspiration from Dutch sources for a century or more under constantly changing conditions, it is necessary to glance at the political, religious, social and commercial relations of the two countries. For it is from such causes that architecture received its most salient expression and still receives it even now.



Façade Designs by Philip Vingboons. From "Gronden en Afbeeldsels der voornaamste Gebouwen." (Amsterdam, 1648.)

SIR CHRISTOPHER WREN

The Flemings were attracted to our shores from early times by hopes of profit, or were driven here by persecution at home: numbered amongst them were skilled workers in divers crafts whose presence here accustomed the native craftsmen to methods far removed from their own. In the south-eastern portion of England, nearest to their own shores, they have left their indelible mark. The Dutch—who inhabited the northern portion of the Low Countries—were of the same race and language as the Flemings, but gradually became differentiated from them in culture by the fact of their more general acceptance of the Reformation and their successful revolts from Spain. Distinctively Dutch influence begins to manifest itself in the reign of Elizabeth: marked developments here are traceable from that brilliant reign, when religious and commercial ties drew the two countries together. The Dutch and the English Protestants were naturally not unsympathetic towards one another, while from many other points of view the Dutch people came into touch with the Elizabethans, and their country offered unlimited opportunities for adventure, than which there was no stronger appeal in those days. Politically, Holland was useful in the game of harassing Spain, and much was to be gained by cultivating an intercourse which, though not without its dangers, offered many compensations. The English may have taken up a patronising attitude towards the Dutch, but none the less they admired their achievements in many fields, cultural no less than commercial. The Dutch gradually became serious competitors in sea-borne trade—eventually driving England out of the East Indies—and throughout the first half of the seventeenth century success seemed to reward their efforts in every new

undertaking. In fact so signal were their successes during these years that they roused England to feelings of intense rivalry. It was this spirit which spurred on the English and led to a widespread acceptance of Dutch models—not only in commerce and finance, but also in other matters affecting the whole life of the people—showing eventually in the character of the houses they built and the methods they resorted to for decorating them. Irritation at Dutch success and supremacy proved a more impelling force towards imitation than mere sympathetic adherence to their methods could ever have been. But bitterness inevitably accompanied the irritation. In the time of Charles I this was very marked ; reaction was not long, however, in manifesting itself. For some years after the outbreak of Civil War there was a strong feeling of friendship towards Holland, and this is to be accounted for by the fact that the Calvinistic outlook of the Dutch was reflected in the religious observances of a large party in England. There was continuous effort through a long period to realise a new consciousness, particularly in the religious domain. During the disturbances which convulsed Europe, England generally found herself on the same side as the Protestant Powers. Sweden was Protestant, as also was Denmark, and this is of particular historical interest, since Sweden, the Netherlands and England entered into a Triple Alliance for defensive purposes, an alliance which was later to bear fruit of signal architectural importance. The Protestant religion inevitably brought forth a Protestant expression in architecture which swept over countries widely separated geographically, but closely knit by religious ties. Cromwell, whose earnest desire was for a religious compact between the Protestant Powers of north-west

View in Amsterdam. From "Schenck and Danckerts," 1645 and later.

House and Courtyard. From Dahlberg's "Suecia antiqua et hodierna." Stockholm, 1691 and later.

Europe, was not long at war with Holland, and all through the first half of the seventeenth century it may be said that, though Dutch ambitions often clashed with English aims and inevitably led to bad feeling and jealousy, no less on one side than on the other, still it was the fashion in England to adopt Dutch ideas and methods because it was seen that they invariably led to success. One outcome of this was that Dutch craftsmen were encouraged to establish themselves in England. They brought their handicrafts and skilled workmen with them, while their extensive sea-carrying trade led to the establishment of Dutch settlements on our eastern coast. Thus King's Lynn, in particular, through its trade with Baltic ports, saw a Dutch colony established there, and with the constant intercourse between such a flourishing port and Holland, it is easy to account for strong Dutch influence in the architecture of the town and its neighbourhood, amounting in isolated instances almost to the reproduction of Dutch designs on our shores.

Not only in the building art—and especially in the use of brickwork—were we learning from the Low Countries, but in many crafts impetus was given to British endeavour. Moreover, a powerful school of Dutch painters had arisen who were in contact with England; Van Dyck, Sir Peter Lely, Jacob Huysman, and the Van der Veldes, father and son, are amongst those who settled here. It must, in fact, be recognised that Dutch art, as exemplified in its painting, was an accepted importation long before the rise of an English school of landscape and decorative painters at the end of the seventeenth century.

The presence here of such men as Sir Balthazar Gerbier and his pupil Captain Winde (or Wynne) is

also not without its significance. Gerbier may have built little, but he contributed by his publications towards the acceptance of principles which were transforming the practice of architecture in this country. Born at Antwerp in 1592, he was entrusted with diplomatic missions by Charles I, and although he fell upon evil times which limited his sphere of activity, he produced a book * about which it has been said that its early date gives it a value and an interest altogether exceptional on account of the insight it affords into the practice of architecture at the time of Wren. Of Captain Winde, a native of Bergen-op-Zoom, not much is known except that he furthered design on lines which before long were accepted on all hands.

King Charles II and the Royalist exiles, though none too well treated in Holland, came back fired with the beauty of the buildings and schemes of interior decoration which they had seen there. These returned exiles correspond to the cultivated amateurs who, at more than one epoch in our history, have influenced the trend of design in architecture. Convinced of the adaptability of Dutch models to English use, they either directly—when they had the means—or indirectly by disseminating knowledge of what they had seen, helped to spread the already established vogue for Dutch art in its many aspects, but more especially in the matter of house design, internal decoration and garden lay-out. Even more important were travellers like John Evelyn and Sir William Temple, who familiarised themselves with everything Dutch, and encouraged

* "Counsel and Advise to all Builders": by Sir Balthazar Gerbier, Douvily, Knight, 1633.

View of Church, dated 1691. From Dahlberg's "Suecia antiqua et hodierna." Stockholm.

a movement which was entering upon its second phase as regards architecture, inasmuch as reflections of the Renaissance in Italy had by that time entirely changed the course of design. The matured Renaissance in Holland owed much to Italy, and through Dutch channels it reacted upon our vernacular style of the seventeenth and early eighteenth centuries as surely as direct contact with Italy eventually shaped the course of our more academically minded designers. Evelyn may, in the first instance, have been attracted by arboriculture and gardening as practised by the Dutch, but he was also intensely interested in architecture, studied it seriously, wrote and published books upon it, and without doubt gave the fruits of his knowledge to Sir Christopher Wren, with whom he was on terms of close friendship.

When in Amsterdam in 1641, Evelyn records in his Diary that on St. Bartholomew's Day he went amongst the booksellers and visited the famous Hondius and Blaeu's shop. And the books that he found there must have been a revelation, for by that time some fine folio works delineating the Classic orders according to Serlio,* Vignola and other Italian masters, as well as others illustrating Dutch Renaissance design,† had already been published. A copy of a notable book published in Amsterdam in 1598 containing well-drawn

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* Serlio's "Bookes of Architecture" were translated out of Italian into Dutch, and in 1611 out of Dutch into English.

† Cornelis Danckerts: "Architectura Moderna," fol., Amsterdam, 1631. Illustrations of many of Hendrik de Keyser's works are included in this volume.

plates of the Orders * can be definitely associated with Evelyn, for it was found in the attic of Wotton House, his home for several years. These books—which differ essentially from the earlier "pattern" books emanating from Antwerp, inasmuch as they are more scholarly and less fantastic, the drawings being generally to scale—were the forerunners of a series of Dutch books recording the work of architects who practised in Amsterdam and other important cities, and the dates of their publication make it possible that they could have been known to Evelyn, and by him they were undoubtedly brought to the notice of Wren.

Whilst England was convulsed with Civil War and little encouragement could be given to Inigo Jones and John Webb, who had already introduced the Italian manner into England, the Dutch were building up a strong Classic school of design founded on the works of Palladio and Scamozzi by men who had studied at the fountain head in Italy. Amongst them were Hendrik de Keyser, who built the Old Exchange at Amsterdam, and Jacob van Campen, who worked at Amersfoort and Haarlem, but who is best known for the Town Hall at Amsterdam, built between 1648 and 1655, and illustrated by means of large-scale drawings in a fine book † published in 1661, some seven years after his death.

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* H. Bloem: "Een Constich Boeck van de Vijf Columnen van Architecture, te weten Tuscana, Dorica, Ionica, Corinthia ende Composita," fol., Amsterdam, 1598.

† Jacob van Campen: "Afbeelding van't Stadt Huys van Amsterdam," fol., Amsterdam, 1661. This building was transformed into the Royal Palace in 1807.

Church of St. Margaret Pattens.
From a Drawing by J. Coney,
1812.

Church of St. Margaret Pattens.
From a Drawing by J. Corey,
1812.

Earlier than this, and probably of even greater importance, is the first book of Philip Vingboons, an architect who came of a family of artists of Flemish origin, but dwellers in Amsterdam after 1585. Very little is known of the career of Philip Vingboons (or Vinckeboons), and he never, in all probability, visited Italy, although he seems to have been familiar with certain buildings in Paris. It is evident that he was conversant with Palladian architecture, for his mature manner after 1650 owes much to it. He greatly influenced the development of domestic architecture in Holland, and evolved the type of town-house best suited to Amsterdam, while he was to no small extent responsible for the type of country house peculiar to Holland in the mid-seventeenth century. Amongst his many executed works is the splendid Trippenhuis at Amsterdam built about 1662. He not only built much but published designs during his lifetime, and the first edition of his works, with plates carefully engraved by his brother, Johannes, was published in 1648.* This was followed by a second volume in 1665 and another edition in 1688. The importance of such publications is obvious in accounting for the Dutch influence on English architecture, for they contain numerous large-scale plans, elevations and sections (see Plate facing p. 176), from which any architect could have derived the salient characteristics of the design and detail. And they happen to be the characteristics which distinguish the domestic work of the time of Wren, and suggest the source of inspiration for many of his own designs. The similarities between the designs especially of brick town and

* Philip Vingboons: "Gronden en Afbeeldsels der voornaamste Gebouwen," fol., Amsterdam.

country houses contained in these volumes and those which constitute the so-called "Georgian" vernacular are too striking to be accounted for as being merely accidental.

Another Dutch architect of renown, a contemporary and, in a sense, a rival of Philip Vingboons, was Pierre Post, a pupil of Jacob van Campen. The Town Hall at Maestricht, finished about 1663, was one of his chief works, and scale drawings of this were published in a folio in 1670,* an impressive book which also doubtless found its way into England. This was followed later by his collected works, illustrated by a fine series of engraved plates and accompanied by descriptive text in French.† That such books should have been published, and that repeated editions of some of them were called for, is significant, for they are essentially books for architects' use, seeing that they contain not only plans, elevations and sections to scale, but often external details and interior fittings and ornament. Swags of fruit and flowers, such as Wren delighted to cut in brick, to carve in stone and to model in plaster, abound in the folios of van Campen and others, while the grouping of windows, the hipped roof and central pediment, the ample chimney-stack and the well-designed lantern all occur persistently in the plates issued in the name of Philip Vingboons. It was essentially a brick style, subdued and dignified, which, in the hands of capable designers, could be used on a great scale for

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* Pierre Post: "Het Stadhuys van Maastrigt.; Le Portraict de la Maison de Ville de Maastricht," fol., Amsterdam, 1670.

† *Id.*: "Les Ouvrages d'Architecture," fol., Leyden, 1715.

a royal palace as readily as it lent itself to the simple expression of a merchant's town or country house.

In ecclesiastical architecture the effects of a union with countries no longer held in the thraldom of the middle ages were no less remarkable. The need for churches in England which should meet the requirements of Anglican ritual as well as the demands of the preaching house was met by the provision of spacious interiors, similar in many respects to the type which had already been evolved on the Continent. But since Wren found himself after the Great Fire constrained to plan rather with a view to making the most of the irregular sites allotted to the reconstruction of churches than in conformity to any definite organic system, he was less open to foreign influence for his main dispositions—in which beauty was governed by utility—than he was in the external design of towers and steeples where free play could be given to an unfettered imagination. The tower and spire builders of his native country, with all their consummate skill in design and craftsmanship, had bequeathed nothing to suggest the many-storied tapering compositions in stone and lead-covered timber which cluster round St. Paul's Cathedral.

Owing to the confined sites of the City churches and considerations of expense, Wren in most instances kept the exteriors severely plain, and concentrated on the towers, and especially upon their superstructures, for external effect. His steeples are unique in their variety of graceful outline and consummate skill in the harmonious combination of concave and convex forms. With all his resource and imagination, however, Wren could not have evolved these masterly designs without reference to the achievements of steeple builders in other lands than his own, and precedent for many of them

is to be found in the Renaissance steeples of Northern Europe rather than in those erected in France or Italy. The illustrations contained in architectural folios published in Holland * and Sweden † afford innumerable instances of the type of many-storied steeple that Wren favoured for certain positions. The example here reproduced (see opposite), from Danckerts' "Architectura Moderna," 1631, is representative of church steeples that had been set up in many cities of Northern Europe long before Wren introduced them into London. He realised that the acceptance of such a feature would go far to redeem the external bareness of a church from any near point of view, while the value of a number seen collectively in any general view of the City would be inestimable.

In the matter of individual features, and more particularly interior fittings, decorative work and ornament generally, not only in churches but also in houses, there can be little doubt that motives were requisitioned from Dutch as well as from French books. When the vastness of Wren's practice is considered, and the necessity he was under of delegating details to subordinates, the need for such aids will be at once recognised without any detraction from the master's genius. Of such books there were as yet none of English origin, but many had been published abroad and could not fail to have been available here. In his reliance upon

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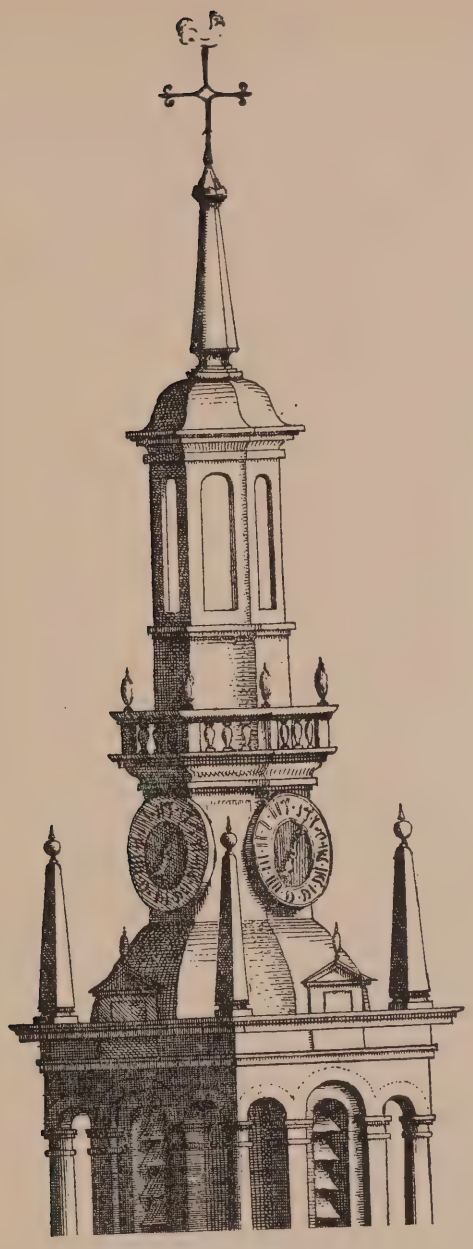
* Henrik Hondius, the younger: "Les cinq rangs de l'architecture . . . avec quelques belles ordonnances," fol., Amsterdam, 1617, and later editions to 1651.

† E. Dahlberg: "Suecia antiqua et hodierna," fol., Stockholm, 1693. Some of the plates in this book are dated 1691.



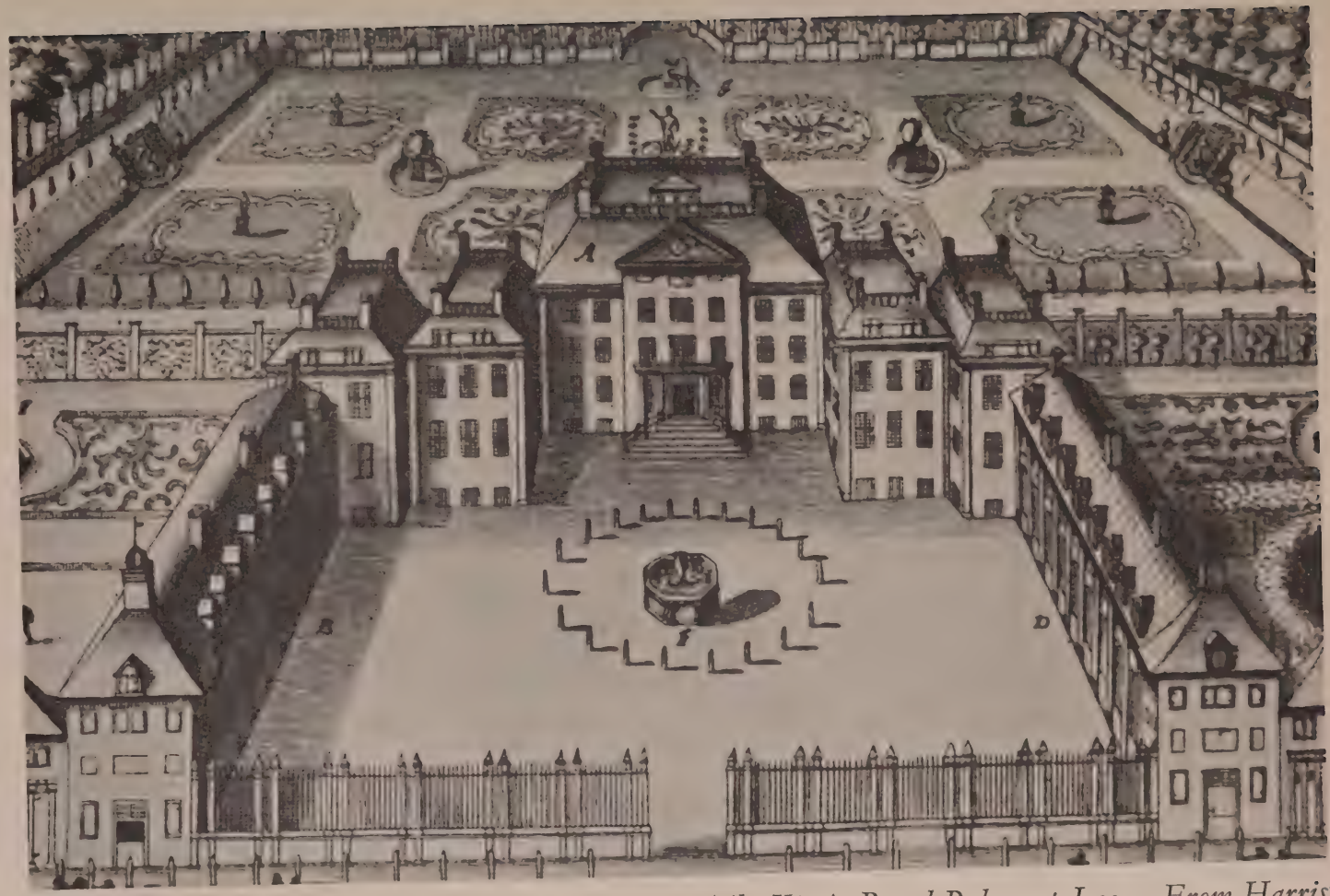
Steeple Design by Cornelis Danckerts. From "Architectura Moderna," fol., Amsterdam, 1631.

oak and in his treatment of the material, Wren again shows his sympathy with the practice of the Low Countries and France: the Italian use of stucco—which had already been introduced into England and which was destined to prevail ultimately—being discarded in favour of the more homely sheathing of wood for interior walls. The sash window of Holland also found its way into this country and became one of the most persistent features of English domestic architecture. We do not seem to have accepted this innovation before the time of Charles II, and it is difficult to determine precisely when it became general even in Holland. Writing in 1699, Dr. Walter Harris * describes the Royal Palace at Loo as having "large shash-windows" throughout, but the carefully engraved view of the building does not indicate sash windows, neither do the engravers of this period fill in the window openings with sufficient detail to enable the exact form of window to be determined (see Plate facing p. 192). It seems as though the engravers continued to fill in window openings in the manner to which they were accustomed long after the actual window fitting had been changed.

Dutch influence on English architecture, and especially on Wren's contribution to its development in so many directions, naturally culminated in the time of William and Mary. The Court was then largely Dutch, the king had a strong affection for his native land, and there was a better feeling on the part of the average Englishman towards the people of the country whence he came. All memories of past quarrels and rivalries had by no means been effaced, but a widespread antipathy

* Walter Harris: "A Description of the King's Royal Palace at Loo," London, 1699.

had been succeeded by some measure of sympathy. Evidences of this influence are to be seen on all hands: Dutch artists were attached to the Court, and opportunities were offered painters, craftsmen and others, who thus found ample scope for their work. But such conditions could not prevail indefinitely. Fashions change, and the zenith of this movement having been reached, decline was inevitable. Moreover, Holland after 1690 no longer occupied its former place of importance in European affairs. The French Court, and with it French culture, had taken the lead in Western civilisation, and it was from France and Italy rather than from Holland that guidance was sought in matters affecting the surroundings of social, religious and industrial life, strengthening a tendency that had previously manifested itself, and ultimately bringing about the substitution of French and Italian models for the Dutch which had been long preferred.



The King's Royal Palace at Loo. From Harris' "The King's Palace and Gardens, Loo." 4°. London, 1699. (R.I.B.A. Collection.)

FRENCH AND ITALIAN INFLUENCES ON SIR CHRISTOPHER WREN'S WORK. *By W. Henry Ward, M.A., F.R.I.B.A., F.S.A.*

CHRISTOPHER WREN'S life task fell to him in exceptional circumstances. It coincided with a period of recently restored political stability favouring a renewal of building activity—even without the unprecedented demands created by the Fire of London—while reaction from the Puritan stand-point brought with it a revived interest in the arts.

He came to this task with an exceptional equipment of character, capacity, education and social position, which enabled him to seize upon the almost unparalleled professional opportunities that were his lot as a means for the settling of the national style.

A period of transition in English architecture had set in before the Civil War. The mediæval tradition overlaid with half-understood Renaissance garnishings still dominant in Jacobean days had received a rude blow at the hands of Inigo Jones, whose virile taste and breadth of handling had pressed the Renaissance attack from the outworks to the citadel of English architecture. Disturbed conditions and absence of a Court had given a set-back to this new impulse, and confusion reigned. It was Wren's work to establish the

new manner of building on a firmer basis by drawing upon a wider range of sound and up-to-date foreign example, while investing it at the same time with a more thoroughly national complexion.

It was not within the bounds of possibility that he should abandon the lead of his great predecessor and revert to mediævalism. Though, with a breadth of view rare in his time, he exhibited—both in his writings and his buildings—an appreciation of the merits of Gothic architecture and of the structural problems the solution of which had helped to shape it, he was yet the child of his age and could not be expected to swim against the whole current of European civilisation.

The primary matter in which the architectural thought of his times worked was the architecture of Antiquity as re-interpreted by Italy. While it was undoubtedly through the work already accomplished in England by Inigo Jones and his school that Wren—in the first instance—absorbed these influences, this work scarcely afforded sufficient material for a national tradition. Many of Jones' secular designs had remained wholly or partly unexecuted, and the very few essays in church design of his generation had not proved entirely successful. Technical works in English were also still extremely scanty. Wren was thus constrained to draw afresh upon the accumulated experience of other countries.

What were his opportunities for so doing? They were supplied by a single visit of a few months to Paris, and—for the rest—by the information to be gleaned from the professional literature of the Continent, supplemented by prints and drawings.

Some account of his brief stay on the Continent is contained in extracts from a letter written by him in

Paris and reproduced with accompanying comments by his grandson, Stephen Wren; and a catalogue of the books and illustrations available for him to consult at various stages of his career might easily be compiled. The amount and character of the material he derived from these sources and wove with a masterly hand into the fabric of his design can only be estimated by reference to his works.

The letter, which with the explanatory matter occupies no more than two pages of the "Parentalia," and is on many points regrettably reticent, is yet of the highest interest in giving an account of the way in which he spent his time, of the persons and buildings he saw and of the impressions he received, accompanied by remarks so pregnant that they have passed into the stock-in-trade of architectural criticism, where, as often as not, they are misquoted.

In the summer of 1665 while the Plague was raging in London, Wren at the age of thirty-two "took," to quote his grandson,* "a journey to Paris, where at that time all arts flourished in a higher degree than had ever been known before in France; and where was a general congress of the most celebrated Masters in every Profession, encouraged by Royal Munificence and in the influence of the great Cardinal Mazarin.† . . ."

"I have," says Wren in the letter, "busied myself in surveying the most esteemed Fabricks of Paris and the Country round; the Louvre for a while was my daily Object, where no less than a thousand Hands are constantly employed on the Works; some in laying

* "Parentalia, or Memoires of the Family of the Wrens," p. 261. Stephen Wren, fol., London, 1741.

† Mazarin had died four years previously.

mighty Foundations, some in raising the Stories, Columns, Entablements, &c., with vast Stones, by great and useful Engines; others in carving, inlaying of Marbles, Plaistering, Painting, Gilding, &c., which altogether make a school of Architecture the best probably at this Day in Europe."

After some notes on the "Collège des Quatre Nations" (Palais de l'Institut) and certain academies and collections of rarities, he continues: "But I must not think to describe Paris and the numerous Observables there in the Compass of a single Letter.—The King's Houses I could not miss. Fontainbleau has a stately Wildness and Vastness suitable to the Desert it stands in. The antique Mass of the Castle of St. Germain and the Hanging Gardens are delightfully surprising (I mean to a Man of Judgment), for the Pleasures below vanish away in the Breath that's spent in ascending.

"The Palace, or, if you please, the Cabinet of Versailles call'd me twice to view it; the Mixtures of Brick and Stone, blue Tile and Gold make it look like a rich Livery; not an Inch within but is crowded with little Curiosities of Ornament: the Women, as they make here the Language and Fashions and meddle in Politicks and Philosophy, so also in Architecture; Works of Filgrand and little Knacks [=filigree and nicknacks or gewgaws] are in great Vogue; but Building certainly ought to have the Attribute of eternal, and therefore the only Thing uncapable of new Fashions.

"The masculine Furniture of the Palais Mazarine pleas'd me much better, where is a great and noble Collection of Antique Statues and Bustos (many of Porphyry), good Basso Relievos, excellent Pictures of

the great Masters, fine Arras, true Mosaicks,* besides Pierres de Rapport in Compartiments and Pavements; Vases in Porcelain † painted by Raphael and infinite Rarities; the best of which now furnish the glorious Appartment of the Queen Mother at the Louvre, which I saw many times.

"After the incomparable Villas of Vaux ‡ and Maisons I shall but name Ruel,§ Courances, Chilly, Essoane,‖ St. Maur, St. Mande, Issy, Meudon, Rincy,¶ Chantilly, Verneul,** Lioncour,†† all which, and I might add many others, I have survey'd, and that I might not lose the Impressions of them, I shall bring you almost all France in Paper, which I found by some or other design'd to my Hand, in which I have spent both Labour and some Money."

He had mentioned previously that "Monsieur Abbé Charles introduc'd me to the Acquaintance of Bernini, who showed me his designs for the Louvre and the King's Statue," and now proceeds: "Bernini's Design of the Louvre I would have given my Skin for, but the old reserv'd Italian gave me but a few Minutes' View; it was five little Designs in Paper, for which he hath receiv'd as many thousand Pistoles. I had only Time to copy it in my Fancy and Memory; I shall be able by Discourse and a Crayon to give a tolerable

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* The distinction seems to be between the small inlay all in precious marbles known as "Pietra Dura" and used in furniture, altars and chimney-pieces, and the large pattern work not necessarily all in marble used in floors and pavements.

† Doubtless "maiolica" is intended.

‡ Vaux-le-Vicomte. § Rueil. ‖ Ecouen.

¶ Raincy. ** Verneuil-sur-Oise. †† Liancourt.

Account of it. I have purchas'd a great deal of Taille-douce, that I might give our Countrymen Examples of Ornaments and Grotesks * in which the Italians themselves confess the French to excell.

"I hope I shall give you a very good Account of all the best Artists of France; my business is to pry into all Trades and Arts. I put myself into all Shapes to humour them; 'tis a Comedy to me, and tho' sometimes expenceful, I am loth to leave it. Of the most noted Artisans within my Knowledge and Acquaintance I send you only this general Detail, and shall inlarge on their respective Characters and Works at another Time."

Then follows a table of architects and artists in various branches. We have unfortunately no record of Wren's "inlargement."

This letter with all its omissions puts us in possession of very valuable information on Wren's methods of study, on the persons and things he saw, and on the impression they produced upon him.

It is clear that he wasted no time and lost no opportunity of furnishing his mind and improving his taste. Appreciations or descriptions are given of four royal palaces, one public building, one town and two country mansions, and visits to twelve more are recorded, as well as to academies, museums and workshops, while a great many more are implied.

He says that he "survey'd" the buildings referred to. By this expression he appears to mean that he inspected them and made notes and perhaps sketches, not that he measured or drew them exhaustively; for the illustrations of them he intended to bring home

* Arabesque and other ornamental designs.

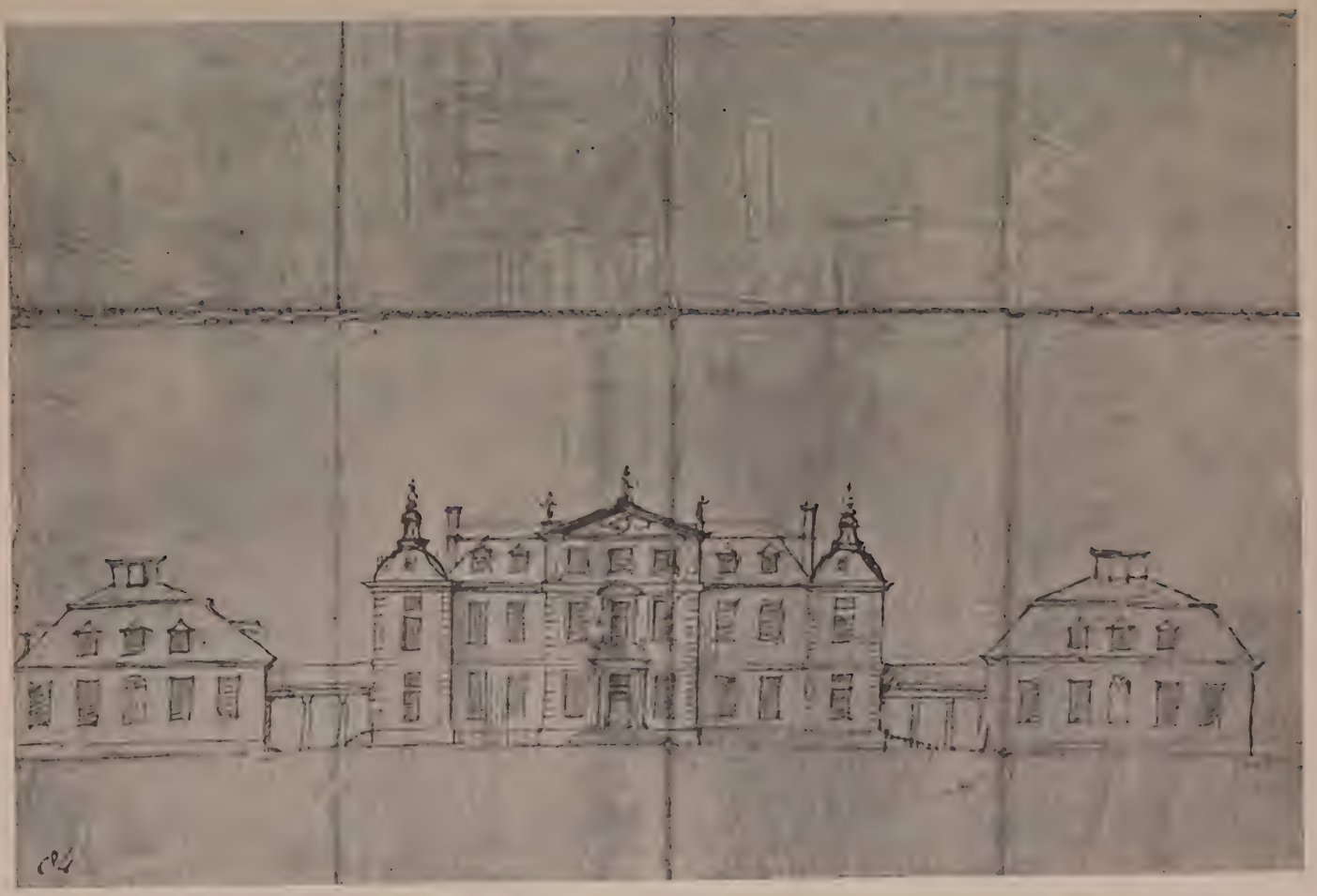

Fig 1. Design for a Mansion.
(All Souls Collection.)

he found "ready design'd." Though the subsequent mention of "taille-douce" might seem to imply that here he is speaking of pen or pencil drawings, it is probable that his collection included prints by such contemporaries as J. Marot, I. Silvestre, and the Perelles, and by older masters such as J. Androuet du Cerceau, among whose works views of almost all the buildings enumerated and many others are to be found.

He did not confine himself to executed works, but collected designs as well. These were issued in large numbers by such engravers as Philibert de l'Orme and J. A. du Cerceau in the sixteenth century, Bosse, Barbet and Vouët under Louis XIII, and in his own time by Cottart, Bullet, Le Muet, Francard, Pierretz, Bérain, and members of the Marot and Le Pautre families.*

Their publications are by no means confined to "Ornaments and Grotesks," but range over the whole field of architectural design, comprising complete buildings, plans, façades, interiors, internal and external features such as doorways, chimney-pieces, ceilings, altars, furniture, panelling, mouldings and ornament generally. Certainly, too, he must have been well acquainted with standard French works on the Orders besides that by Fréart de Chambray which is quoted in a postscript to the letter.

But not content with finished works and paper designs, he laid himself out to observe methods of execution, paid frequent visits to buildings in course

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* *E. g.* P. Le Muet, "L'art de bien bastir"; A. Le Pautre, "Les Œuvres d'Architecture"; J. Marot, "L'architecture française"; "Recueil des plans, &c., de plusieurs chasteaux, &c., &c."; P. Blondel, "Cours d'Architecture."

of erection, observed artisans at their varied tasks, such as the tapestry weavers and silversmiths in the royal and other factories, and made detailed inquiry into every art and craft even remotely ancillary to building. Last but not least he sought personal intercourse with the great architects and other artists of the day.

The architects in his list are Bernini, Mansart, Le Vau, Gobert and Le Pautre.

The Cavaliere Bernini, then at Paris on the invitation of Louis XIV to design the façade of the Louvre, was at the zenith of his fame and regarded as the premier architect of Europe. His superb work, the Piazza of St. Peter's, was still fresh in everyone's memory.

François Mansart, the greatest French architect of the century, author of the "incomparable Villa of Maisons" and many other noble works, several of which were unfortunately never carried out, had forfeited the royal patronage by his too unbending character.

Louis Le Vau, inferior to Mansart both in refinement and in the power of harmonious composition, was yet a great architect. His most famous works for private clients are the Hôtel Lambert in the Île St. Louis, the Château of Vaux-le-Vicomte and the Collège des Quatre Nations. He had for years been at the head of the works in the royal palaces, and was then engaged upon the Louvre, Tuileries and Versailles.

For the inclusion of Gobert in this company it is hard to account. An architect of this name was elected to the Academy in 1680 and another in 1690. The titles of either of these gentlemen to such honours seem to posterity exceedingly slender.

The Le Pautre who closes the list is doubtless

Sir Christopher Wren, President of the Royal Society. From a Portrait attributed to Michael Wright. (Reproduced by courtesy of the Royal Society.)

of erection, observed minutely at their varied stages, such as the tapestry weavers and silversmiths in the [illegible] and other [illegible] and [illegible] course with the great architects and other [illegible] the [illegible].

[illegible] Mansart, Le Vau, Gobert and Le Pautre.

[illegible] at the zenith of his fame and regarded as the [illegible] architect of Europe. His superb work, the Piazza of St. Peter's, was still fresh in everyone's memory.

François Mansart, the greatest French architect of the century, author of the "incomparable Val de Maisons" and many other noble works [illegible] [illegible] [illegible]

Antoine, brother of the better known engraver Jean, and an architect of great distinction. He is remembered by his beautifully planned Hôtel de Beauvais (Rue F. Miron), the upper cascades at St. Cloud and a finely engraved book of architectural and decorative designs.

The sculptors are represented by Sarrazin and the brothers Anguier, who, to mention but one of their works, had collaborated on the sculpture of the Pavillon Sully at the Louvre. Le Brun—also referred to as designer to the Gobelins tapestry works—Poussin, Champaigne and Coypel figure among the "Painters in History," Mignard as a portraitist and La Quintinye, the gardener of Versailles, as a horticulturist, but, curiously enough, Lenôtre is not mentioned. With this exception the list is a fairly representative one of the best talent of the day.

Next, what were the buildings alluded to? Four of the royal palaces take the chief place. At the Louvre Wren remarks only on the extent and activity of the works in progress and on the glories of Anne of Austria's suite. The former consisted in the building and decoration of the three sides of the eastern half of the old court then approaching completion under Le Vau. The "mighty Foundations," however, can only be those of the eastern outer façade now occupied by the "Colonnade," but then intended to be carried out to Bernini's design.

Wren expresses unbounded admiration for this design, which, far from confining itself to these limits, involved a complete reconstruction of the palace. Had he been able to study it at leisure he might have realised that though "masculine" and free from "little Knacks," this piece of Roman baroque *terribilità* would have been singularly out of place in Parisian surroundings.

The Queen Mother's apartments were situated in the " Petite Galerie " begun for Catharine de' Medici, and included the " Galerie d'Apollon," probably at this time in course of redecoration by Le Brun after a fire.

At Fontainebleau Wren is impressed only by the extent and wildness of the palace and its situation, and at St. Germain by the " antique mass " of the old castle. In neither does he commend the delicate work of Francis I's day—not, it is true, seen to full advantage there. He only approaches enthusiasm in referring to the hanging gardens of the " Château Neuf " at St. Germain, which had enchanted Evelyn. They had been constructed for Henry IV, and comprised great flights of steps leading to a series of stately terraces over porticoes decorated with shell-work.

But it is Versailles which gives rise to the formulation of his deepest convictions. We must not think, at this period, of the vast and imposing palace of stone, the home of state and ceremony at the high noon of the " Grand Reigne." A process of transformation had indeed been commenced by Le Vau four years before, but it had evidently so far been confined to the outer courts, and had as yet left untouched the sprightly little brick pleasure-house tricked out with filigree and gilding and redolent of femininity, fit setting for the frolics of a gay and youthful court. The final Versailles of the younger Mansart may have been known to Wren in later days by prints, and in it he would have found something of " masculine " if not of " eternal."

Other royal residences which he must have seen in Paris are the unfinished works of De l'Orme, Bullant and Du Cerceau at the Tuileries ; the Hôtel de Soissons (or " de la Reine ") built by Bullant for Catharine de' Medici, the Luxembourg by De Brosse for Maria de'

Medici, the Palais Royal by Le Mercier for Cardinal Richelieu and then occupied by the King's brother, the Duke of Orleans, whose collections Wren describes. The delicate château of Madrid in the Bois de Boulogne with façades made gay with the majolica enrichments of Girolamo della Robbia would hardly have commended itself to his robust taste.

Of the "villas" or châteaux in the neighbourhood which he enumerates, Chantilly and Ecouen were in the François Premier style, with additions in a more monumental manner by Bullant, which latter, with the work of De l'Orme at St. Maur and the Du Cerceaux at Verneuil must have given Wren the impression that these sixteenth-century masters had led the way to a sound Classical tradition. The old château of Meudon—destroyed shortly afterwards—was of the same type, but had been recently remodelled. It was celebrated for hanging gardens similar to those of St. Germain. Issy, too, seems at that date to have been a remodelled sixteenth-century building. Courances, near Fontainebleau, is a typical example of the brick-and-stone manner of the Louis XIII period, broader in treatment and less ornate than Versailles. Rueil, Chilly and perhaps Liancourt were works of Le Mercier, and Raincy a recent one of Le Vau. Of St. Mandé it is not easy to come by illustrations as it was in 1665.

These twelve are all placed without comment after Maisons and Vaux, which it is a little surprising to find bracketed without distinction under the same terms of commendation. For Wren cannot have failed to discriminate between their merits. Vaux-le-Vicomte has indeed great qualities, and among them a general stateliness of aspect much helped out by Le Brun's decoration and Lenôtre's garden design, but it is

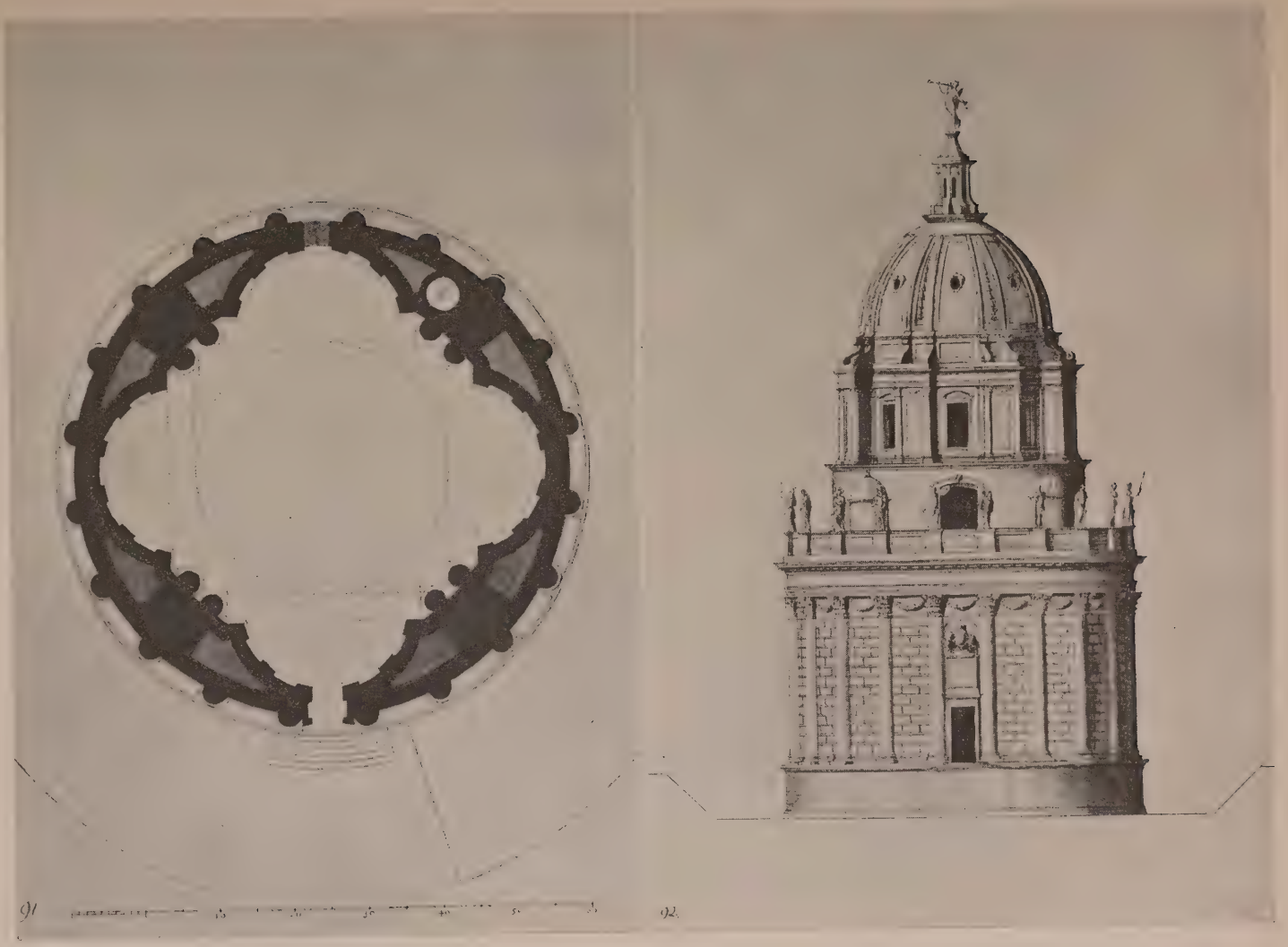
marked by serious faults of composition which keep it well below the level of Mansart's "incomparable" achievement, the majestic serenity and supreme distinction of Maisons.

The châteaux named form as a whole a good representative group of what was to be seen in that class at the time, and there is no need to swell the list.

With one exception town mansions come under the category of "Observables" Wren had not space to describe, and the Palais Mazarin is only mentioned to praise its austerely classical interiors. The remains of this work of Le Muet, erected in 1633, and since incorporated in the Bibliothèque Nationale, still retain some of its original decoration.

There were innumerable other abodes of nobles and *nouveaux riches*, which must have attracted Wren's attention. They include—to mention only a few of those still standing and not already referred to—the sixteenth-century Hôtel de Lamoignon, the Hôtels de Sully and de Mayenne (R. St. Antoine), and the Place Royale (Pl. des Vosges) of the age of Henry IV, the Hôtels d'Avaux (21 R. du Temple) by Le Muet, d'Amelot (47 R. Vieille du Temple), d'Aumont (R. de Jouy) by Le Vau and Mansart, the delightful Hôtel de Carnavalet, the home of Mme. de Sévigné, in which Mansart had lately combined the work of Lescot and Goujon with his own additions in a harmonious whole. The main façade at least must have been quite to Wren's taste.

Only one edifice of a public nature is spoken of in Wren's letter, the College of the Four Nations (Palais de l'Institut), which he says "is usually admired, but the Artist has purposely set it ill favour'dly, that he might shew his Wit in struggling with an inconvenient Situation"—an allusion probably to the awkward course



Plan. *Elevation.*

Fig. 2. Design for Charles I's Mausoleum at Windsor. (All Souls Collection.)

Fig 3. The Pre-Fire Design for Restoration of Old St. Paul's. (All Souls Collection.)

Fig. 4. The "Warrant" Design for New St. Paul's. West Elevation. (All Souls Collection.)

of the streets behind, for as to the front, its site on the quay opposite the Louvre could hardly be bettered, or, it may be added, better filled.

Most of the public monuments with which the reign of Louis XIV endowed Paris were indeed still in the womb of the future. Such are the Portes St. Denis and St. Martin (1672–4), the Places des Victoires and Louis le Grand (Vendôme, 1684–99) and Libéral Bruand's Hôpital des Invalides (1671–4). Wren might, however, see Bruand's earlier Hôpital de la Salpétrière (begun 1656) and the Henri Quatre Hôpital St. Louis, while Boccador's Hôtel de Ville (begun 1532) can hardly have escaped his notice.

When we turn to Church architecture, which the letter entirely neglects, we find there a wealth of Renaissance examples open to his inspection. The sixteenth-century churches of St. Etienne du Mont and St. Eustache are not likely to have differentiated themselves in his mind from Gothic work despite their Renaissance detail. But in the churches of his own century he will have found much food for study. Of Latin cross churches in which the dome does not form the dominant feature, there were the Jesuit Church by Derand (St. Paul et St. Louis, 1625–41), the Oratoire by Métezeau and Le Mercier (1621–7), Notre Dame des Victoires by Le Muet (begun 1656), St. Roch by Le Mercier and St. Sulpice by Le Vau (begun respectively 1653 and 1655). These conform more or less to the type of apsidal, barrel-vaulted and aisled basilica popularised by Vignola's Gesù in Rome.

It has been asserted more than once that Wren can have seen no example of a domed church in Paris except the Sorbonne, and the statement is wont to be triumphantly proved by showing that the Dome des

Invalides (1693–1706) and the Panthéon (1757–1802) are later. It is nevertheless baseless. Mansart had erected (1633–4) his relatively small but finely planned Ste. Marie (R. St. Antoine), in which the dome is the completely dominant feature, with admirable internal effect, though less successfully treated externally. Again, he had designed a considerable domed church for the Minims in the Place Royale, which, if not fully carried out, was well known and to be had at the print-shops. His splendid church of the Val de Grâce, with its noble dome begun twenty years before, was completed in the year of Wren's visit. There was also the remarkably planned church of the Salpétrière, with an octagonal dome between four equal naves and four large angle chapels, begun in 1656, while the elliptical dome over Mazarin's sepulture (Coupole de l'Institut) and Guarini's Theatine Church were actually in course of erection.

The absurd suggestion has been made * and repeated that Mansart may have shown Wren his design for the future Dome des Invalides. It can only be accounted for on the assumption that its author supposed François Mansart (1598–1666) and his grand-nephew Jules Hardouin (1647–1708) to be one and the same person. That either could have foreseen in 1665 that twenty-seven years later a second church would be added to a building which with its first church was not to be begun by another architect till six years later, or that Jules Hardouin at the age of nineteen could, with equal forethought, have produced the design for the great triumph of his maturity, are suppositions equally preposterous.

Indeed the boot is very much on the other foot,

* W. J. Loftie: "Inigo Jones and Wren," 1893, p. 157.

and it is highly probable that the younger Mansart was fired with the ambition of emulating the success of St. Paul's, the designs for which must have been perfectly well known in Paris by 1690.

Such then were the materials which Wren collected in France. His knowledge of Italian work was derived entirely from books and drawings. Some of these will be mentioned in connection with St. Paul's; for the rest, it is sufficient to allude to the standard works of Alberti, Serlio, Vignola, Palladio and Scamozzi on the Orders, with applications of them to a variety of types of design, and to the mass of prints of Italian buildings both religious and secular, among which may be instanced the publications of G. B. Falda and D. Rossi on the monuments, palaces, etc., of Rome which appeared between 1665 and 1673.

The question as to what Wren derived from these sources has now to be approached. To attempt to trace particular influence on individual works would be—except in the case of St. Paul's—an all but impossible task. In the first place its scope would lead far beyond the limits of this essay, and, again, every influence on Wren's mind is so fused in his work with other elements, the principal of which is his strong sense of what is fitting to an English *milieu* and adapted to meet English requirements.

It may, however, be said on general lines that his foreign studies, besides giving him a thorough grounding in the grammar of Classical design, broadened his outlook and set his feet on a wider range of example in design and practice than he could have stood upon had his studies been confined to England.

To particularise further is in most cases hazardous, and in regard to his secular work it seems that it is to

such generalities that the influence of Italy—not the less important for that—must be limited. Saner and more practical than successors who took upon themselves to belittle him as unscholarly, he refused to ignore the requirements of the English climate in the matter of aspect, height of stories, chimneys, windows and so forth in order to conform to recommendations called forth by the torrid summers of Italy or the alleged exigencies of the Orders and the allied laws of Classical composition and proportion.

Yet here and there perhaps a direct hint from Italy may be detected. Sansovino's Library of St. Mark may have furnished the starting-point for the idea which reached its goal in the court front of the Trinity College Library at Cambridge, though, if so, the journey was a long one. We are on safer ground in describing this design in more general terms as an essay in Palladianism.

Perhaps, too, there is a reminiscence of such buildings as the Bridge of Sighs and the Acqua Paola in the treatment of Temple Bar. In any case it is an instance of the Barocco influence very noticeable in some of Wren's work, where, as in the steeples of St. Paul's, it is allied with a purity of detail rare in Italian examples of that phase.

France exercised a rather more tangible sway over Wren's palace and house design. The elevations and general massing of Hampton Court may show kinship with the later Versailles, but the relationship cannot be pressed in points of detail. Several elevations, too, for large houses in the All Souls collection show a family likeness with those to be found in, say, Jean Marot's prints (Fig. 1). In a plan for the Palace at Winchester the court, narrowing by successive breaks, suggests that

Wren may have had in mind the "Cour Royale" and "Cour de Marbre," as perhaps he also had in his rearrangement of Greenwich. The railing with giant Hermæ at the Sheldonian Theatre may well have been inspired by those at Fontainebleau (opposite the Baptistère de Louis XIII) and at Vaux-le-Vicomte, both of which he had seen. The circular-domed mausoleum for Charles I (Fig. 2), the design for which is at All Souls, may not be uninfluenced by the Valois Mausoleum, which he may have seen in derelict incompletion at St. Denis, and could study in the pages of Marot. But this should perhaps be classed rather as an Italian than a French work, since Primaticcio was its author, and it is closely akin to many Italian polygonal and circular buildings, such as Sammicheli's Pellegrini Chapel at Verona.

Similar analogies might be multiplied, but, when all is said, they do not amount to much. Certain it is that some peculiarities characteristic of many French houses which he had seen make no figure in his work; such, for instance, as the abuse of rustication, the Mansard roof, the exaggerated dormers and ponderous square domes.

It seems probable indeed that in his domestic work at least Dutch influence was stronger than French. But in the maturest of it—Winchester School or Chelsea Hospital, for instance—everything of definitely foreign origin is strained out and the mellow flavour is racy of the soil.

The help to be derived from the use of foreign design books in the multifarious needs of a practice so vast as Wren's in the matter of individual features and decoration has already been alluded to. This is particularly the case with internal features and ornament. Many ceilings, chimney-pieces and doorways, altar-

pieces, pulpits and organ-cases in Wren's work and that of his contemporaries would not find themselves out of place in the pages of Jean and Daniel Marot and Le Pautre. Indeed in the case of Hampton Court there is a possibility that Daniel Marot, who, as a Protestant, had fled to Holland and entered the service of William III, may have actually designed some of the fittings. On the other hand, it is almost equally arguable—so little is certain as to Marot's career—that he may have learned much from Wren. His published designs at any rate did not appear till too late seriously to influence Wren.

In many cases, again, such ornamental details as vases, swags and friezes, as well as the proportions of panels and the sections of mouldings in Wren's work, are hardly to be distinguished from French prototypes. Such likenesses are perhaps more noticeable in the sketches than in the executed works, which Wren contrived to invest with his own individuality and an English aura.

In the domain of decoration the influence of craftsmen from various lands employed on his works, and bringing with them their own traditions of design, played a certain part. This, however, is one that may easily be exaggerated, and it may be doubted if they were as numerous as has sometimes been represented. While the carvers employed by the master masons and joiners at St. Paul's are not named in the accounts, and may therefore have included foreigners for aught we know, the other craftsmen and artists who worked there and are named are—with two notable exceptions—English. The splendidly accomplished ironwork (see Figs. 11, 12, 13, 14, 15 and 16 between pp. 108 and 109) came from the workshops of the French smith, Jean Tijou, at Hampton Court, and some of the sculpture

and stone carving was executed by the Holsteiner, Cibber. But this is equalled in merit and surpassed in importance by the work of the English sculptor, Francis Bird. With regard to Grinling Gibbons, it is admitted that his origins were at least as much English as Dutch or Flemish, but, while his manner of interpretation and his genius in execution are all his own, he was working in a style that owed much to the France of Louis XIV (see Figs. 10 and 11 between pp. 108 and 109). Yet in his case, as in that of the whole body of men—Tijou not excepted—working together under Wren's direction, and constituting a regular school of craftsmanship and design, the resultant manner is something which is distinguishable—and distinguishable not for the worse—from anything Continental.

In the domain of Church architecture foreign influences are more clearly traceable than elsewhere. Precedents for Renaissance churches were as good as non-existent in England. Such hybrids as St. Katherine's, Cree, and the thorough-paced but un-English classicism of St. Paul's, Covent Garden, were of little assistance.

But the problem that Wren had to face when London suddenly required a multitude of new churches was a difficult one for which there was no exact Continental model either. He had not to provide solely for preaching as in Protestant countries, nor solely for the mass as in Catholic Europe. However he may have insisted on the necessity for the whole congregation to see and hear the preacher—and what Laudian of them all would have disagreed with him?—neither pulpit nor, it may be added, the stalls of church officials, as in some communions, were allowed to usurp the proper place of the Holy Table. If the Sanctuary did not receive the same prominence as in earlier and later

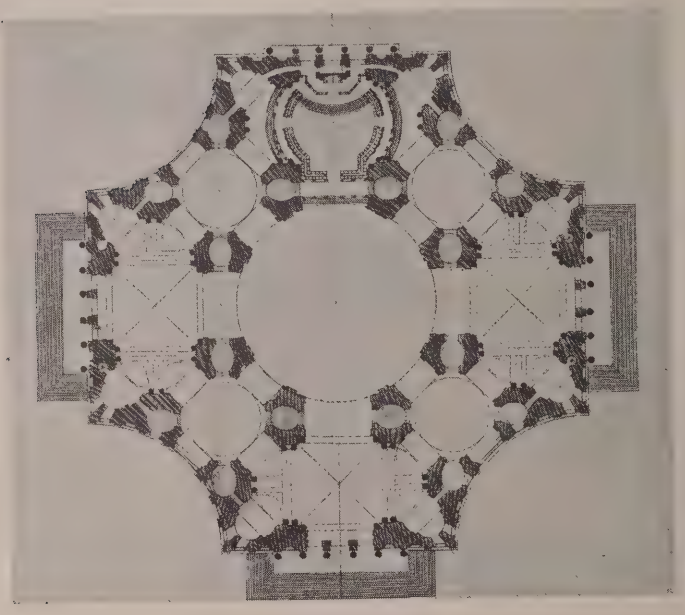
times, it remained the focal point of the church, and was always treated with dignity and as much richness as circumstances would allow.

In no branch of his work did Wren display greater resourcefulness than in devising plans for the usually cramped and irregular sites of the London parish churches, and in doing so, if he drew largely on his own ingenuity, he can hardly have neglected the assistance to be derived from the experiments of Italian architects, more particularly in the fifteenth and sixteenth centuries before church planning had settled down into two or three well-defined grooves.

Apart from St. Paul's, where the problems were to a large extent different, and which will be analysed in detail in its place, Wren adopted three main types, two at least of which were to a certain extent on Italian lines, though modified by two local conditions, the need of providing ample seating accommodation, particularly by the introduction of galleries, and the nature of the materials available for the interiors, where wood and plaster largely replaced stone and marble.

The first of these types is the basilican, comprising a high nave with clerestory, and low aisles separated by arcades or colonnades, and covered by flat ceilings, vaults or a series of shallow domes. Such are St. Bride's, Fleet Street, St. James, Piccadilly, St. Andrew, Wardrobe, and Christchurch, Newgate. The type dates from the early days of Christianity, and had been followed by the Italian Renaissance, with the addition of a small dome, in many forms from S. Lorenzo in Florence to the Annunziata at Genoa.

In a second type a dome gives the keynote to the design as the principal feature of the interior. Here the idea, if not in all cases the actual method of carrying



Figs. 5 & 6. Elevation and Plan. The "Favorite" Design for St. Paul's. First Version. (All Souls Collection.)

Fig. 8. St. Peter's. West Elevation. From Bonanni's "Templi Vaticani Historia," 1696.

it out, is derived from Italy. Such are the rectangular churches, with circular or octagonal domes, of St. Mary, Abchurch, St. Mildred, Bread Street, and St. Swithin, London Stone. St. Mary-at-Hill has a dome carried on from columns set in the centre of a rectangular space, and thus forming a Greek cross with barrel-vaulted arms, an arrangement found in Italy at the Church of Fonte Giusta at Siena and elsewhere, and reproduced as regards the plan at St. Martin's, Ludgate, and St. Anne and St. Agnes, Aldersgate, though there the vaults intersect in place of a dome.

In the finest of his domed churches, St. Stephen's, Walbrook, the design seems to be inspired by the desire of expressing the arrangements of Ely Cathedral in the terms of an Italian domed basilica, without, however, approximating to any particular example.

For the third type, consisting of a ceiled chamber with or without coves, as at St. Nicholas, Cole Abbey, it might be difficult to find earlier precedents in Italy, though the type is not unknown there in later times, and they should perhaps be sought in Protestant countries.

This remark applies with even greater force to the steeples, almost the only type of decorative feature which Wren allowed himself in the treatment of his church exteriors.

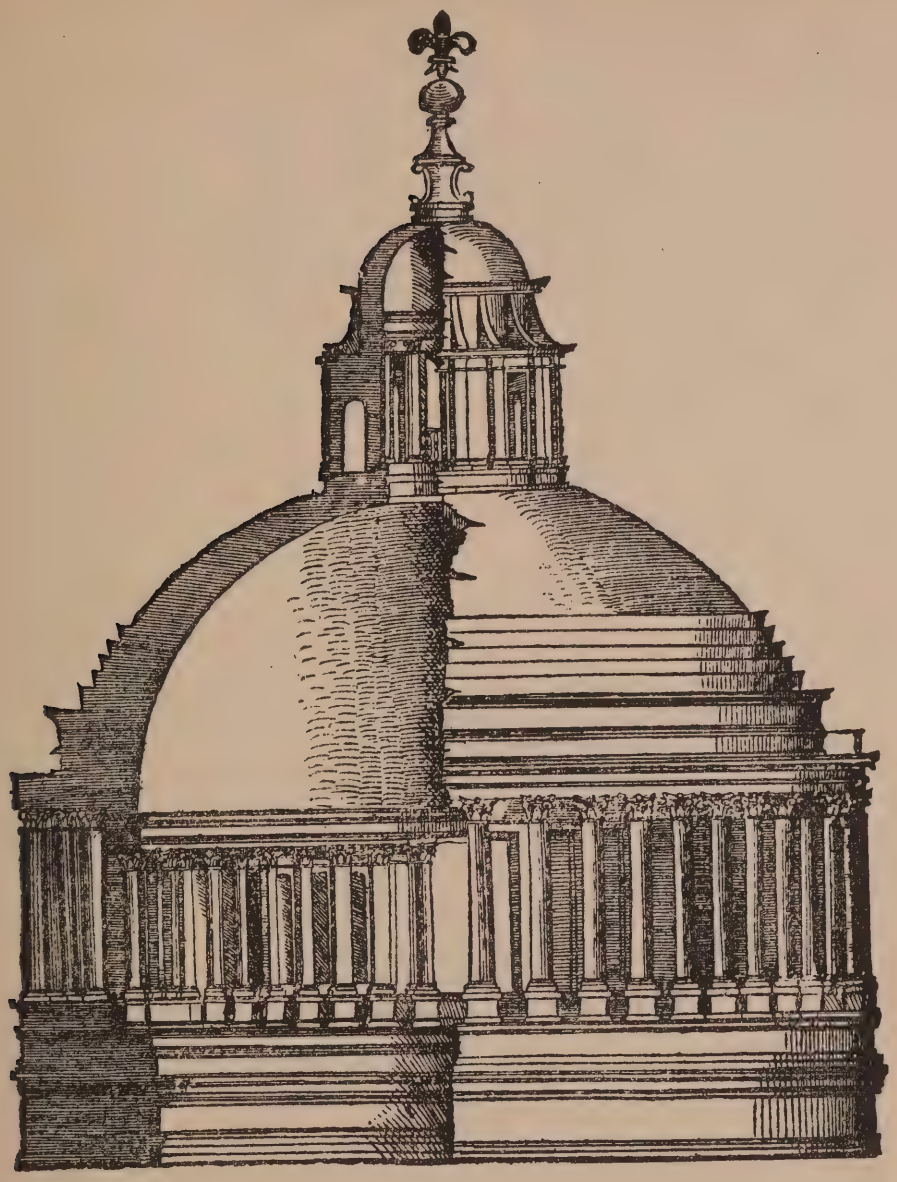
To sum up, it must be agreed that in Wren's work as a whole the traces of his foreign study, though clear, are for the most part of a general character, and that it is seldom possible to establish a direct affiliation between particular buildings and Continental ones.

To this consideration there is one striking exception. Wren's masterpiece has a clear pedigree, and it must be said without the slightest diminution of the

creator's originality, that he could by no possibility have avoided indebtedness. St. Paul's had one great predecessor, and St. Peter's was before Wren as a pattern to follow and to improve upon. St. Paul's would not have been what it is without St. Peter's, any more than St. Peter's without the Duomo of Florence, or the Duomo without the Pantheon and other ancient and mediæval predecessors. But St. Peter's was not the only model that Wren consulted, and it is clear that on the one hand some of the churches he had seen in France and must have known of in Italy, and on the other Old St. Paul's and Ely Cathedral, were not without a share in shaping his design.

Bearing in mind the dual nature of Anglican worship which had to be provided for here as in the parish churches, we shall see that the extent to which Continental models swayed Wren's thought in the successive stages by which the executed design was reached varied according as his intentions were more or less ruled by shifting circumstances.

There were four such stages. (1) The Pre-Fire Design. Before the fire it was his aim to complete the process begun by Inigo Jones of clothing the mediæval structure in a Renaissance dress, and to adapt it to contemporary needs. (2) The Favorite Design. In his first design for a new building—that which he himself preferred—the aim was to produce an ideal Classical church. (3) The Warrant Design. The design accepted by the king in 1675 was devised to lull clerical and popular prejudices to sleep by a scheme Gothic in essentials and Classic in little more than detail. (4) The Final or Executed Design. In the work as carried out the architect retraced his steps towards his Classic ideals as far as a process of cautious elimination



La pia

Fig. 7. Half Section and Elevation of Bramante's Design for the Dome of St. Peter's. From Serlio's "Tutte l'Opere d'Architettura." Venice, 1619.

and remodelling would carry him without re-awakening slumbering dogs.

But in all these stages Continental models, and especially St. Peter's, were manifestly in his mind. If there were no other evidence for this, there is the significant fact of the presence among the All Souls drawings of a carefully drawn sheet of comparative plans and sections of St. Peter's and Sta. Maria del Fiore.

Wren's visit to Paris was fresh in his mind, and St. Peter's had been finished a generation ago when in 1666 he began to be occupied with the problem of St. Paul's. Though he had not seen Rome, prints of St. Peter's as completed by Michael Angelo and his successors were available for his study. Nor is this all. He could have access to some at least of the fluctuating stages of evolution out of which the final design had emerged. Serlio, for instance, gives the Latin cross plan attributed to Raphael, the Greek cross plan attributed to Peruzzi, and a section through Bramante's dome, and Vignola gives Michael Angelo's plan and rear-elevation.

How far Wren can have been acquainted with the numerous other designs now to be seen in the Uffizi, Vatican and Vienna libraries must be uncertain. But it is hardly open to question that, at a period when technical books were still relatively scarce, engraved and manuscript copies of notable designs and even sketches of modern buildings passed from hand to hand in architectural circles. Any such that were to be had illustrating the premier church of Christendom are certain to have found their way into the collection he acquired in Paris, while the similarity of some of his early designs is too close to leave any doubt that he was acquainted with some at least of the early designs

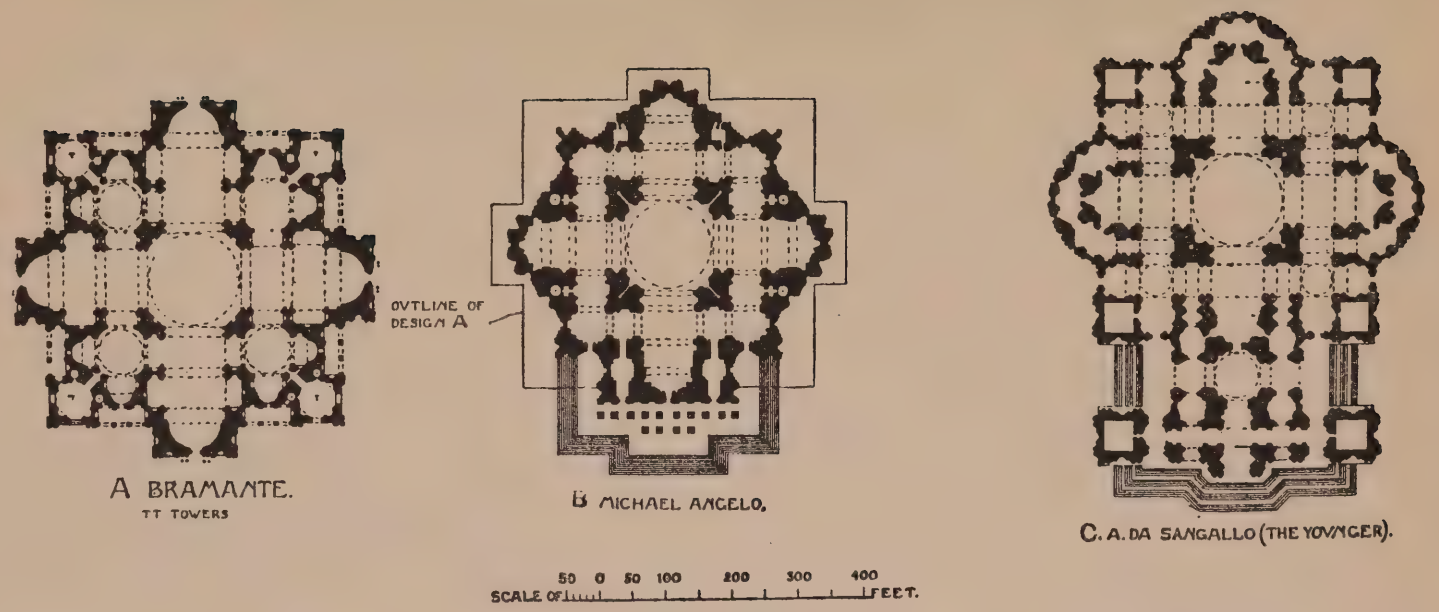


Fig. 10. Early Plans for St. Peter's, Rome.

for St. Peter's other than those above mentioned. In the later stages of the building he would have before him the fine and detailed publications of Fontana * and Bonanni † on the completed basilica.

In all his designs for St. Paul's Wren, swayed by considerations at once practical and æsthetic, made a circular dome the dominating feature. If its form in section and elevation is considered, it will be seen that it always consisted of a brick or stone dome relatively low in order to agree with the internal proportions of the church, and of a covering structure of timber designed to give a good external effect. This duplication, rudimentary at Florence and Rome, had long before Wren's time become common property in domed churches. The device of an intermediate cone to carry the lantern (see Plate facing p. 88) which he eventually introduced was his own invention, though the mediæval baptistery of Pisa—if he knew of it—may have supplied him with a hint, also utilised by him on a small scale at the College of Physicians, Warwick Lane.

In the Pre-Fire Design (Fig. 3) the inner dome took much the same form as Bramante's (Fig. 7), being almost semicircular in section stepped externally above the springing, as at the Pantheon, and placed on a drum surrounded by an unbroken ring of columns, which, however, are engaged instead of standing free. But the resemblance is masked by the superposition of a timber dome surmounted by a lantern terminating in a giant pineapple.

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* C. Fontana: "Templum Vaticanum," etc., fol., Rome, 1694.

† P. Bonanni, S.J.: "Templi Vaticani Historia," etc., fol., Rome, 1696.

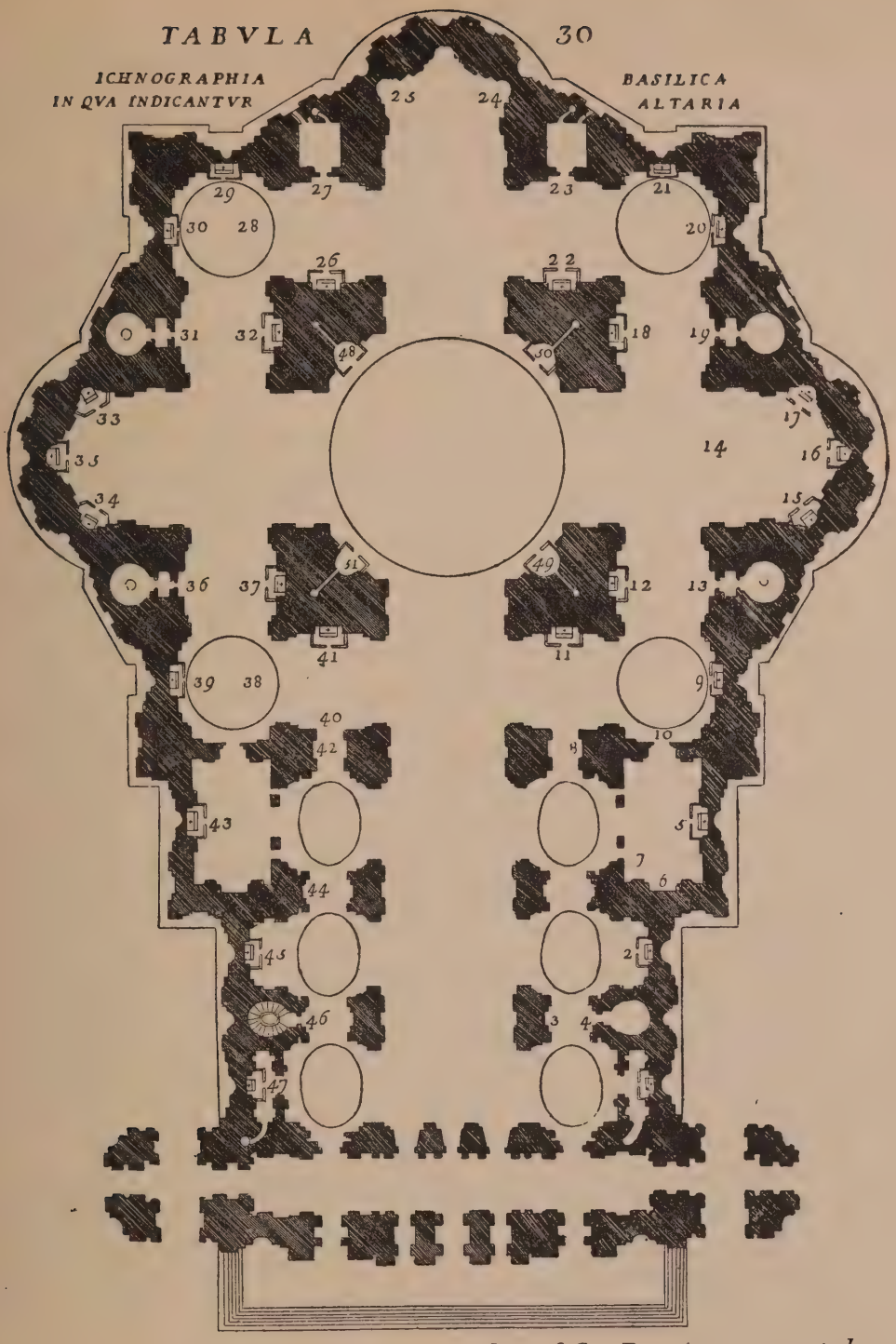


Fig. 11. Plan of St. Peter's as executed. From Bonanni's Templi Vaticani Historia, 1696.

In the Favorite Design (Fig. 5) the dome approximates in outline very closely to that of Michael Angelo's, with the same reversed consoles connecting the buttresses with the upper part of the drum which were designed by him but omitted in execution. In the lower part of the drum, however, the buttresses are not emphasised as by Michael Angelo (Fig. 8), but concealed in a ring of engaged columns or—in the model—of pilasters, recalling Bramante's peristyle.

In the Warrant Design the dome is, of course, dissimulated under the steeple demanded by conservative opinion (Fig. 4), but it comes to its own again in the early sketches for the Final Design. In one of these (Fig. 9) the dome is closely modelled on Michael Angelo's, with not only the consoles, but also the bold buttresses below them emphasised in the same way, by the entablature breaking round them and by engaged columns.

These features were abandoned in the Executed Design (see Plate facing p. 224), which in the balustrade over the peristyle, the square windows in the upper drum, and the curve of the dome, bears a marked resemblance even in points of detail to the design carried out in miniature by Bramante in the *tempietto* at S. Pietro in Montorio. The introduction of four solid blocks as buttresses into the line of the colonnade without breaking the circle of entablature and balustrade is the triumphant result of Wren's prolonged endeavours to combine the grace of Bramante's system with the strength, both apparent and real, of Michael Angelo's.

When we turn to the plan of the dome space we find that in all but the Favorite Design it is octagonal, but that the octagon is a regular octagon—not merely a square with the angles cut off as at St. Peter's—and of

ERRATUM

P. 220, fifteenth line from foot, *for* p. 224, *read* p. 46.

Fig. 9. St. Paul's. A Variant of the Final Design. (All Souls Collection.)

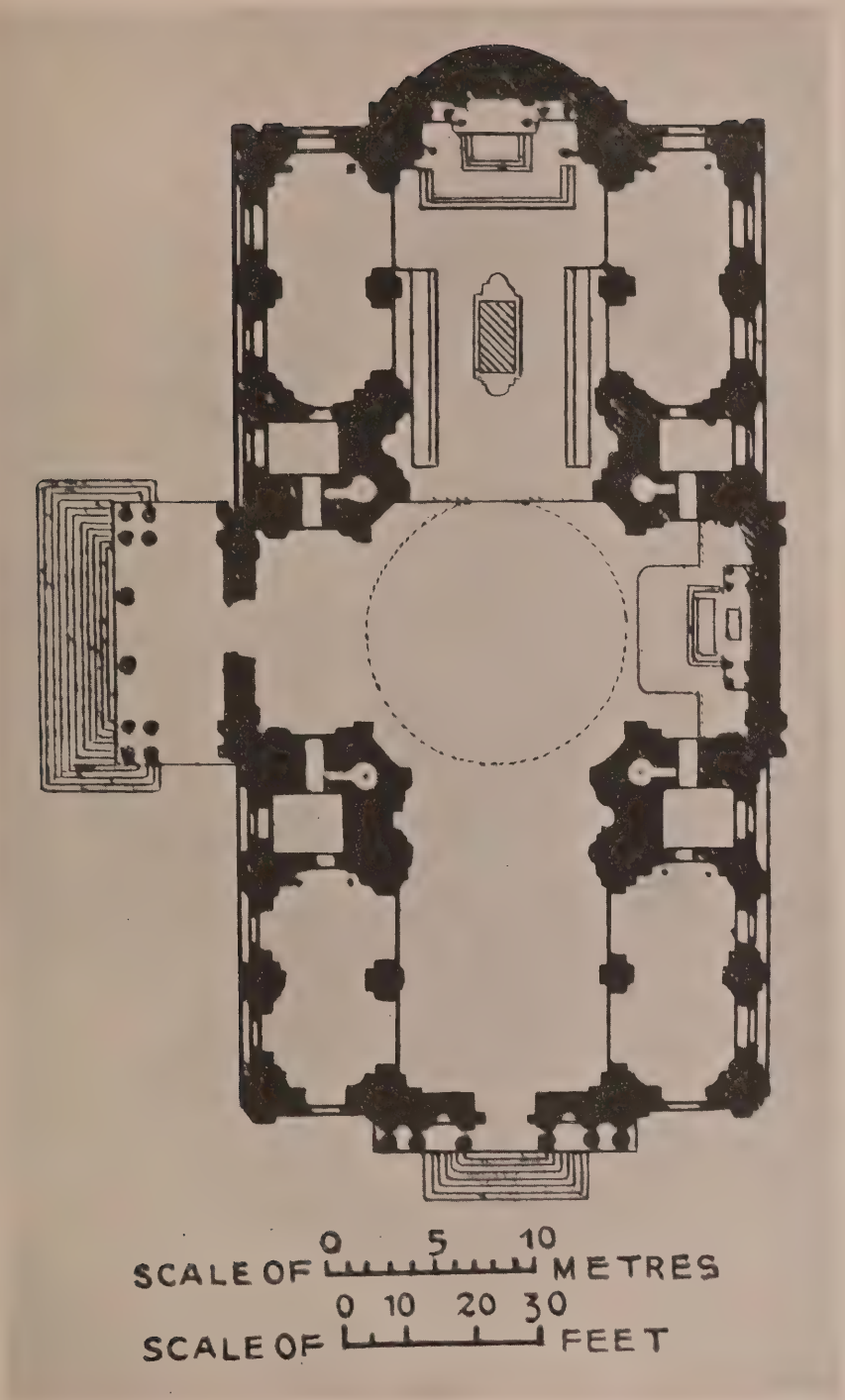


Fig. 13. Plan of the Church of the Sorbonne, Paris.

the full width of nave and aisles, so that the aisles deliver into it and do not stop, as at St. Peter's, against the piers. This arrangement is probably borrowed by Wren from his uncle's cathedral at Ely, and is obtained in the Pre-Fire Design by removing the four crossing piers.

In considering the successive plans of the cathedral as a whole it will be seen that reminiscences of St. Peter's are as striking as in the design of the dome, though combined with reminiscences of other Continental churches.

Wren's preference for his radiate or Greek cross plan is well known. This type of planning has indeed always exercised a fascination over the minds of architects. The Italians of the Renaissance, who had before them such ancient examples as S. Lorenzo at Milan and the so-called Temple of Minerva Medica at Rome, besides that of S. Vitale at Ravenna and many later mediæval polygonal plans, never tired of experimenting in designs of a similar type, for the most part so devised as to include a Greek cross. But, as proved in the case at St. Paul's, the weight of clerical opinion was generally thrown into the scale in favour of basilican or Latin cross plans. At St. Peter's the Papal Court wavered at first between the two. But eventually Bramante's Greek cross plan (Fig. 10–A) prevailed, though it was modified in execution, and in the seventeenth century turned into the semblance of a Latin cross by Maderno's additions (Fig. 11).

Aiming at combining the system of the Pantheon with that of the Basilica of Maxentius, Bramante placed his great dome between four equal vaulted arms, and further encircled it with four smaller domes set between them. This arrangement was followed in Wren's

Favorite Design (Fig. 5), though in a variant of it he substituted four additional domes for the vaults over the arms.

Another influence on this design should not, however, be overlooked. The dome space dominates the entire church more completely than is the case in Bramante's design, and in this Wren may have been thinking of Mansart's Ste. Marie, where this idea—carried out with charming effect—may have been suggested in its turn by Brunelleschi's plan for Sta. Maria degli Angeli at Florence.

To the pure radiate plan Wren added, in another version of the same design (Fig. 12–A), a western extension in the form of a domed vestibule approached through a portico between square blocks or rudimentary towers, and in this he can hardly have been uninfluenced by the almost identical unexecuted plan of Antonio da San Gallo the younger (Fig. 10–C). It is not impossible also that he may have had in his mind Longhena's masterpiece, Sta. Maria della Salute, where a small dome between twin towers is so happily grouped with a larger dome.

In the Warrant Design (Fig. 12–B) the plan is little more than a rendering of a Gothic cathedral plan, modified, as at Ely, to take a dome at the intersection.

In the Final Design, while the elongated plan of the "old Gothick Form of cathedral churches" demanded of him is maintained, it receives a more classical complexion. It is not, however, to the triapsal Latin cross plans designed by Fra Giocondo and Raphael for St. Peter's, or the simpler single apse type popularised all over the Continent by Vignola's Gesù, that he turns for inspiration, but, apparently, to that of Le Mercier's Sorbonne (Fig. 13), which he must

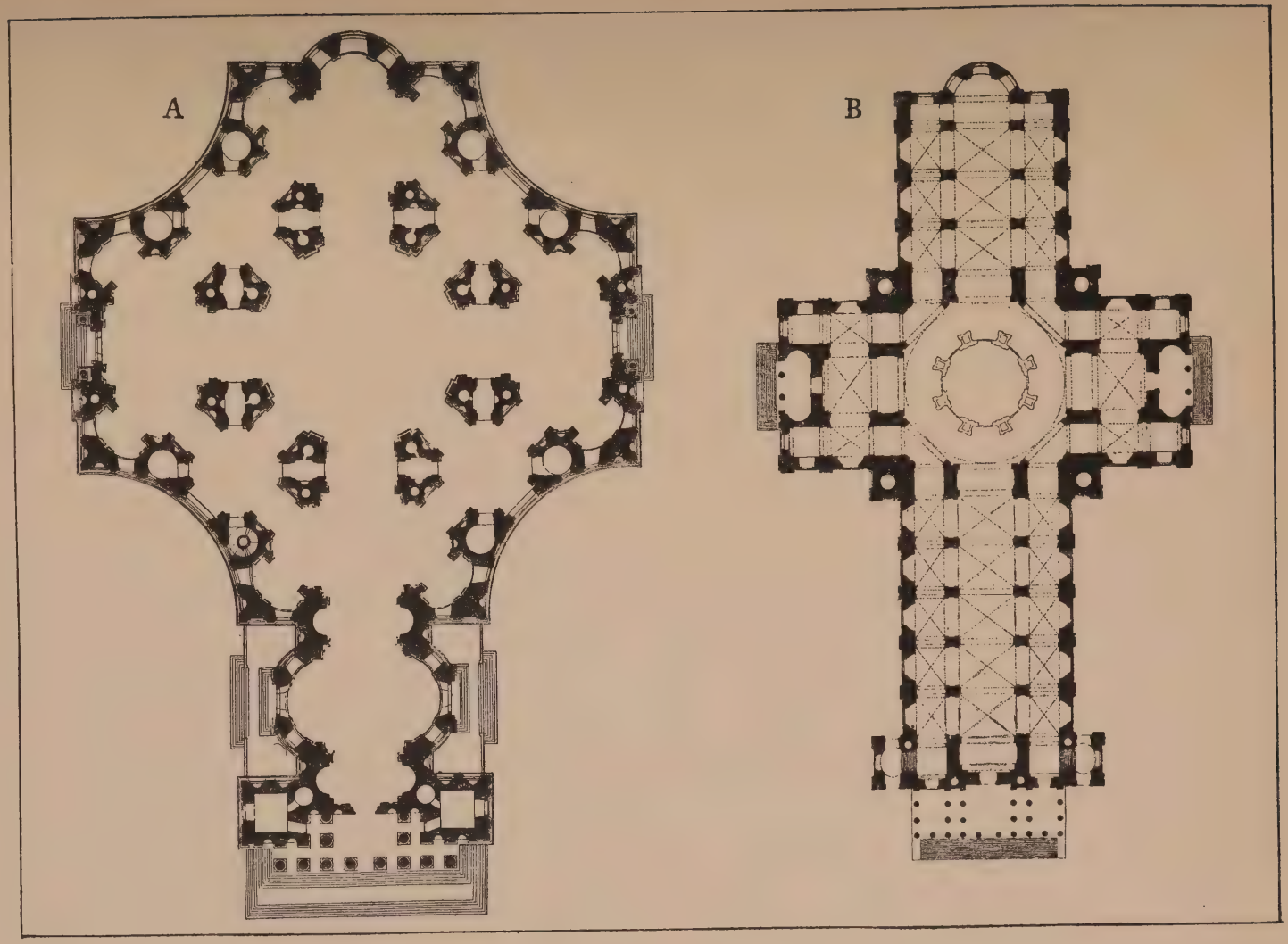


Fig. 12. A. *Plan of "Favorite" Design.*
B. *Plan of "Warrant" Design.*

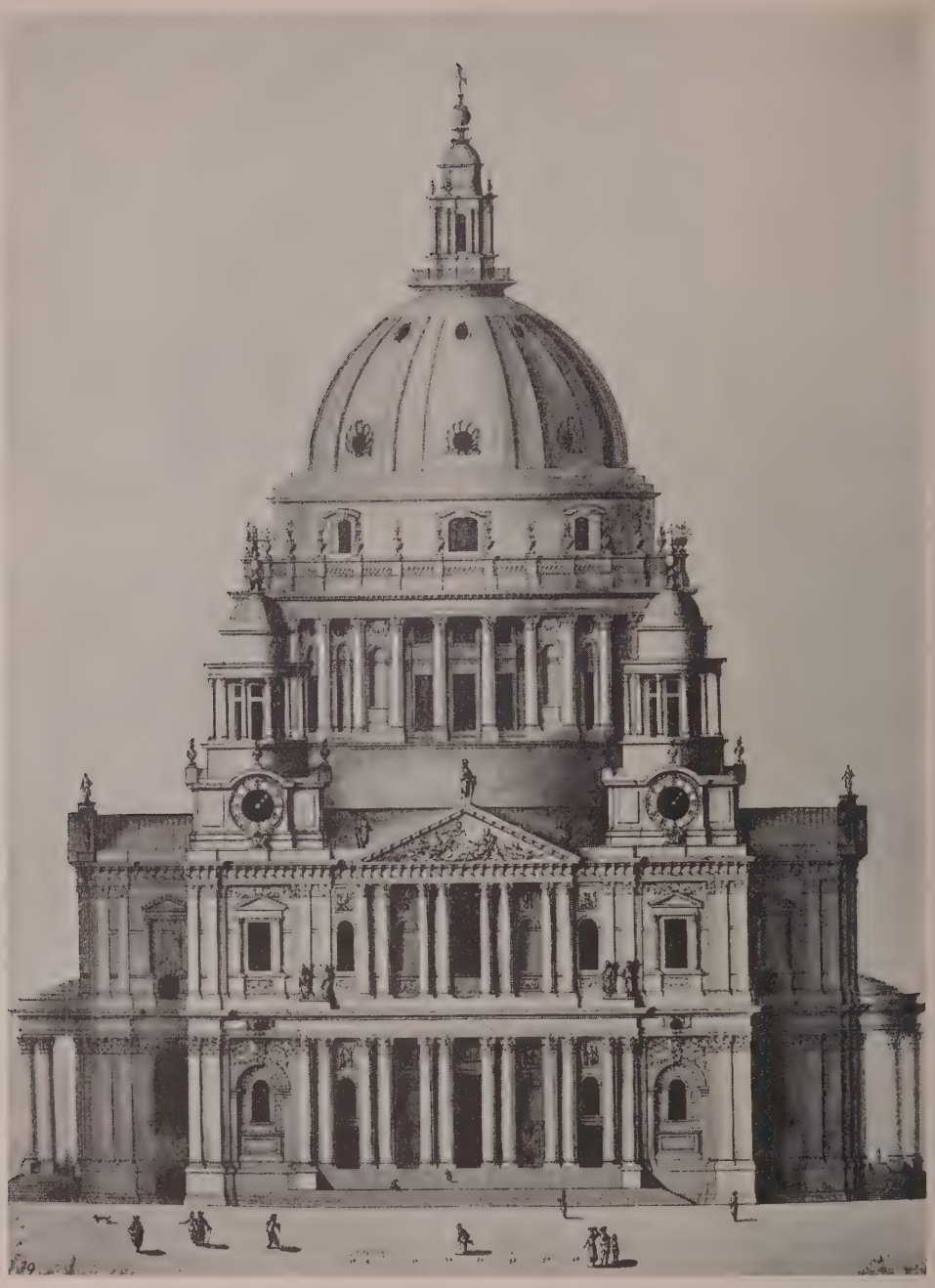


Fig. 14. St. Paul's. A Variant of the Final Design. (All Souls Collection.)

have seen—recently completed—in Paris. For, at St. Paul's, as at the Sorbonne, the dome is set between a choir and a nave of equal length, the transepts are short, and the choir terminates in a small apse. At the west end the treatment is reminiscent of the Favorite Design, comprising as it does a domed vestibule—almost incorporated, it is true, in the nave and thus obscuring the likeness to the Sorbonne—and a portico between towers no longer rudimentary.

The chapels with which at this stage he was compelled by the Duke of York to flank the nave may have been suggested by those in Maderno's extension, where, however, they are attached to the central mass and not, as at St. Paul's, to the towers.

When we turn to the elevations it is easy to detect in the Favorite Design (Figs. 5, 6) the influence of Michael Angelo's (Fig. 8). Both are treated with a single Giant Order set upon a podium and supporting an attic. The subsequent designs had superposed Orders like the earlier designs for St. Peter's, but they differ from these in being coupled.

In the treatment of the West end (Fig. 4) it is only natural that the Warrant Design should approximate to Inigo Jones's system—a gable flanked by scroll buttresses masking the aisle roofs, and short towers beyond these. But a pediment is substituted for the gable, and thus we have the typical Continental church front of the Renaissance.

But in the Executed Design Wren rejected this type for one less common—at any rate before his time—in which the nave front is framed in—without intervening scrolls—between a pair of high towers (see Plate facing p. 104). It occurs, it is true, in San Gallo's design for St. Peter's and in execution at Sant' Anastasio dei Greci and the

Trinità dei Monti at Rome, and if Wren may have owed something as regards the general arrangement of his façade to illustrations of these churches to be found in the sixteenth- and seventeenth-century guide-books to Rome, he did not allow them to influence the remarkably able design of the steeples rising above the main cornice of the church. This was not reached at one bound. An earlier and much tamer design was long retained by him in successive schemes (Figs. 9 and 14). But the steeples were built between 1704 and 1707, and it is therefore clear that when he finally revised their design he had had the opportunity of studying and improving upon far more imaginative baroque examples in Rome. Among these Borromini's campanile at Sant' Agnese and those designed by Bernini, by Ferrabosco and by Rainaldi to correct the monotony of Maderno's façade at St. Peter's may well have suggested a more lively treatment. In these he would have found the characteristic features of anglewise projections of coupled columns breaking the circular form of the main story, and of the ogee outline of the cupola and buttresses above it.

In extending the coupled Order of the church to his much-discussed portico, it is not necessary to suppose that he was indebted to Perrault's colonnade at the Louvre, although he must have known of this design, which superseded Bernini's in 1667. The device occurs frequently in church façades before that date. De Brosse employed it at St. Gervais, Derand at St. Paul, Mansart at the Val de Grâce and Le Mercier at the Sorbonne, not to mention Borromini at Sant' Agnese, while during the building of St. Paul's it was contributing to the sumptuousness of Sta. Maria Zobenigo at Venice (1680–8). It is true, however, that in none

of these examples is it used so consistently as by Perrault, nor is it so completely detached from the wall behind as in the porticoes of the Louvre and St. Paul's.

In the internal treatment of the cathedral the divergence from St. Peter's, producing the most important results on the total effect, lies in the lightening of the piers throughout in approximation to mediæval methods. The peculiar elevational treatment of the canted sides of the octagon, a somewhat unsuccessful solution of a problem imposed by the plan, is entirely Wren's own.

The interior shows another important departure from the system of St. Peter's in that the vault springs from an attic and not direct from the main entablature. In this Wren was following in a well-trodden path; for the same device, timidly hinted at in S. Sisto at Piacenza and other fifteenth-century churches, and more confidently used in S. Salvatore at Venice, had been fully established by Vignola in the Gesù, and imitated by Domenichino in S. Ignazio at Rome. In abandoning the theoretically more logical treatment of St. Peter's, Wren and his predecessors were fully justified by the æsthetic result of considerable gain in scale. At St. Paul's, in suggesting a triforium, it has the additional advantage of contributing to the "cathedral fashion" demanded by Wren's clerical critics.

Every great artist, who has come to be regarded as the head of a school, has consciously or unconsciously laid the past under contribution for the formation of his own style. Wren was no exception. In his case, as we have seen, many of the elements that he assimilated can be traced to their origins at home and abroad. This process of research might profitably be carried yet further. But when all that is possible has

been done in this direction, the all-important factor in the greatness of his work will still be to seek—the vivifying creative mind of the man without which all these elements would have remained disjointed dry bones, the mind which knew how to draw—and to draw largely—on sources of many kinds without being submerged in them.

There could be no greater mistake than to assume that, if all the examples mentioned above and yet others can be shown to have left their traces in Christopher Wren's work, anything derogatory to his originality or genius has been proved. St. Paul's is no more a cento painfully composed out of bits of Italian and French churches, the homely Wrenian house no more a cento of French and Dutch houses, than the "Æneid" is a compilation out of Homer, Apollonius and Lucretius, or "Paradise Lost" out of the Ancients and Elizabethans. Each is a fresh work of genius inspired by and enriched with reminiscences of the past fused together in the crucible of a poet's brain, to issue forth the mellowed expression of its age and country.

Since this essay was in print I have had the opportunity of seeing the catalogue of Wren's library in the Bodleian as sold in 1748, and ascertaining that it comprised practically all the Italian and French works referred to as probably studied by him, and some others.—W. H. W.

Model of the Chapel believed to have been done under Wren's supervision. Found in Pembroke College Chapel in 1923.

Photograph of Pembroke College Chapel as existing to-day, with Mr. Gilbert Scott's Additional Bay.

PEMBROKE COLLEGE CHAPEL, CAMBRIDGE, SIR CHRISTOPHER WREN'S FIRST BUILDING. *By Ellis H. Minns, Litt.D., and Maurice Webb, D.S.O., F.R.I.B.A.*

IN any study of Wren's work this Chapel at Pembroke College is of importance, as it is, with the exception of the little doorway at Ely, his first work in the field of architecture. It is vulgarly but affectionately known, therefore, as "Wren's first job," and, like many other young men's first jobs, it was given to him by his uncle, Matthew Wren, his father's elder brother. Matthew Wren (*b.* 1585), having been Fellow and President of Pembroke, became in 1632 Master of Peterhouse and later Bishop of Ely. Being an extreme high churchman he almost shared the fate of Laud and spent from 1642–59 in the Tower of London. While there he vowed some special work if he should escape alive, and this took the form of a new Chapel for his old College.

There is little documentary history in Pembroke Treasury (Hardwick Box F. 1–5) in connection with the Chapel. There do, however, exist (1) a sketch which is now published and which is almost certainly a tentative design by Wren; (2) a wooden model of the Chapel as it was finally built—probably prepared

under Wren's directions—and showing meticulous care in its construction, even to the proper representation of the metal straps which strengthen the roof timbers; (3) the Contracts for the Brickwork (May 16, 1663) and Woodwork (January 10, 1664–5), both published in Willis & Clark's "Architectural History of the University of Cambridge," and (4) a draft letter from Dr. Franck dealing with the drainage of the Burial Vault under the East end. It is interesting to note that during a necessary opening of the Vault this year it was found to contain the bodies of Matthew Wren and three other members of the Wren family.

The Chapel was consecrated on September 22, 1665.

To students of architecture the sketch and the model are more interesting than the documents. The model agrees almost exactly with the Chapel as built, save for a circular window over the North door, which goes to show that its construction preceded the building, while the sketch is evidently a preliminary one only. In it the Chapel was to have had five bays instead of four, the bays divided by stone pilasters breaking into a heavy stone cornice, and each carrying a large pineapple-shaped stone ornament. In each bay was a great semi-circular-headed window.

In the executed design the number of bays was reduced to four, the pilasters and vases omitted except at the four corners, and a wooden cornice substituted for the heavy stone one, possibly on the grounds of economy. The design of the windows remains substantially as in the sketch. This is an interesting example of the development of a design by elimination of immaterial details with the retention of the main idea.

The real interest in this the first building by Sir

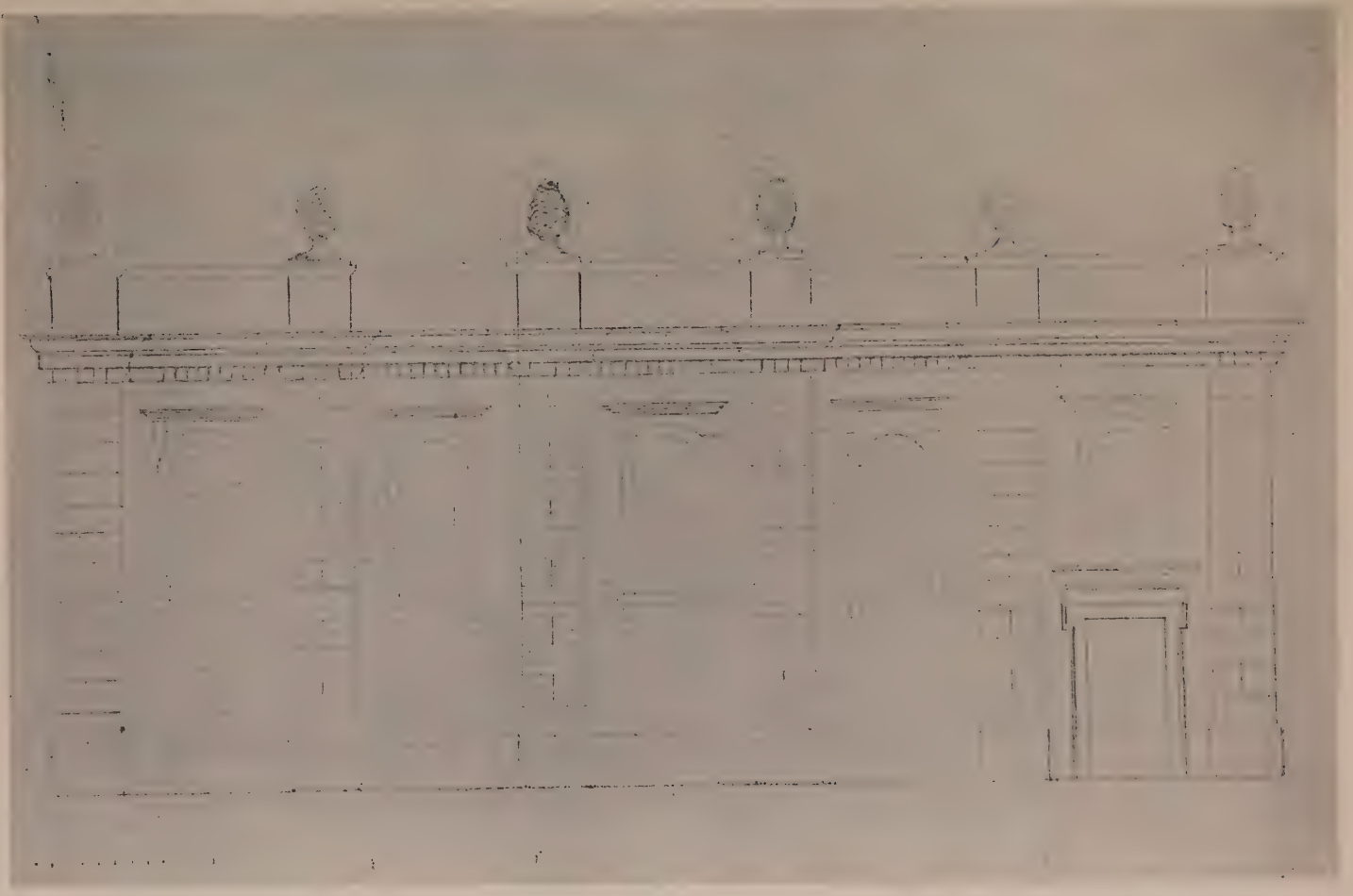
Christopher Wren is to be found not in any peculiar beauty of the building or its decoration, but in the tendencies which are evident in both. The plan is similar to several of his City churches, consisting of two rectangles, the smaller forming an ante-chapel and the larger the chapel itself, with an organ placed over the lower ceiling of the ante-chapel. Internally, both are panelled in oak to about ten feet high and ceiled with elaborately enriched plaster ceilings. Neither show the excellence of craftsmanship of his later work, but in the plaster work especially can be traced the seeds of future growth. Externally, the plain red brick of the North and South walls, with the sparing use of stone for the dressings round the windows, makes no attempt at display, but harmonises with the older buildings of the College.

The East and West ends are all in stone, the West end facing the street being original. The East end was taken down and rebuilt in the nineteenth century by Mr. Gilbert Scott when he was called upon to lengthen the building by one bay.

It is remarkable and a tribute to Wren's early genius that this building of his, built in a style unknown, or almost unknown, in England at that time, fits its surroundings so well and at the same time exactly suits the purpose for which it was built. In the result we have a perfectly satisfying building redolent of Roman architecture, foreign in its ornament, but by one of those touches of genius which Wren so frequently exhibited, this severe and foreign design was brought into relation with the picturesque buildings of this mediæval University town by a delightful little bell turret perched upon the apex of the Classical pediment of its West front.

SIR CHRISTOPHER WREN

In this little turret at Pembroke College we can see the beginnings of the fancy of the scientist who, experimenting with architecture, discovered its possibilities and eventually let his fancy play to the delight of all London in half a score of delicate spires which, raised above the soot and fog upon sturdy masses of simple brickwork, act as beacons to our citizens. Pembroke Chapel was his first experiment, it might have led nowhere : it did lead to St. Paul's.



Found in Pembroke College Treasury in 1923; believed to be Wren's First Sketch for the Chapel.

The Bodleian Library, Oxford. View of the South Side of the Divinity School and Duke Humphrey's Library from the Garden of Exeter College, showing Wren's Additional Buttressing.

SIR CHRISTOPHER WREN'S REPAIR OF THE DIVINITY SCHOOL AND DUKE HUMPHREY'S LIBRARY, OXFORD. *By Edward Prioleau Warren, F.R.I.B.A., F.S.A.*

IT is interesting to turn for a moment from contemplation of the splendid record of creative design due to the genius and unflagging industry of Wren, and to consider briefly the very complete evidence, documentary and circumstantial, of his quick insight and ready ability in other directions, preserved in the Bodleian Library, and presented by a part of its old buildings.

To do this is to find the great architect employed, as so many of his professional successors have been and are employed, in the preservation of an ancient building. In Wren's case, and in this instance, his labour was obviously a labour of love. He was a most loyal son of Oxford, and immensely indebted to the Bodleian Library.

Early in the year 1700 the attention of the Vice-Chancellor was drawn by statements of the workmen employed by the University, to the serious condition of the Divinity School, and of its well-known and elaborately vaulted stone ceiling, which was badly cracked and showing signs of failure, while "Duke Humphrey's Library," which forms the upper floor immediately

over it, showed corresponding evidences of weakness, as was natural, the two forming one range, of two floors in height.

The Vice-Chancellor in the first place consulted Dr. Gregory, Savilian Professor, a man of science, and a friend of Wren's, with the result so clearly and intimately recorded by the documents preserved in the Library, and still more important by the preservation of its buildings.

The first of these documents to which attention must be drawn is :

" An abstract of the Papers relating to the Divinity School and Library in Oxon., 20 Novr. 1700."

The other documents to which we refer are :

The first report of the three University workmen :
Thomas Robinson, Mason ;
George Smith, Carpenter ;
Thomas Young, Smith ;
dated May 28, 1700 (see inside back cover).

Sir Christopher Wren's letter of June 20, 1700, to Dr. Gregory (see inside back cover).

The second report of the workmen sent with a section as requested by Sir Christopher Wren.

The section returned with Wren's sketch additions of additional buttress, shores, etc. (see illustrations between pp. 236 and 237).

A working drawing of union of tie-rod, sent by Sir Christopher Wren.

Sir Christopher Wren's letter of July 23, 1700, to Dr. Gregory (see inside of front cover).

A photograph of south side of Divinity School and Duke Humphrey's Library, from Exeter College Garden —showing Wren's additions to the buttresses.

The subsequent as well as antecedent course of events is clearly shown by the workmen's report of May 28, 1700, of which we show a photograph, and in which they express the laudable desire "to preserve the Beauty of the said roof," by Sir Christopher's letter of June 20, 1700, to "the *Wrfull* Doctor Gregory, Savilian professor in Oxford," and by his subsequent letter of July 23 (photograph), which contains his comments on the inadequacy of the buttresses, which "are not sufficient to poyse soe heavy and flat a vault having the Bayes soe wide by means they are not weighty enough to resist the force in the place where it is properly to be resisted," and his advice as to alternative measures of remedy to be applied, by iron ties and reinforcement of buttresses.

He accompanies this letter with a rough explanatory sketch section through the building, prepared by the workmen at his request, with his own sketch additions, showing his suggestions as to the treatment of the southern buttresses, the shoring up of the vaulting, etc.

Both of these remedies were applied, the iron ties were inserted, and are still in place, their external head plates being wrapped in lead. Heavy new foundations were formed, with blocks of stone, on the south side, and with the ramping arch below ground, which he describes. Upon this structure the additional buttresses, of about the dimensions given, and of the width of the old buttresses, were built against the lower portion of the latter, as shown in our photograph taken recently in Exeter College Garden; one of the most interesting points of his scheme being that the added lower buttresses were not to be bonded into the old work. "The workmen will suppose that the new worke ought

to be bonded into the old, but this I forbid, least it should hang upon the old, and tend to draw it more out of its perpendicular."

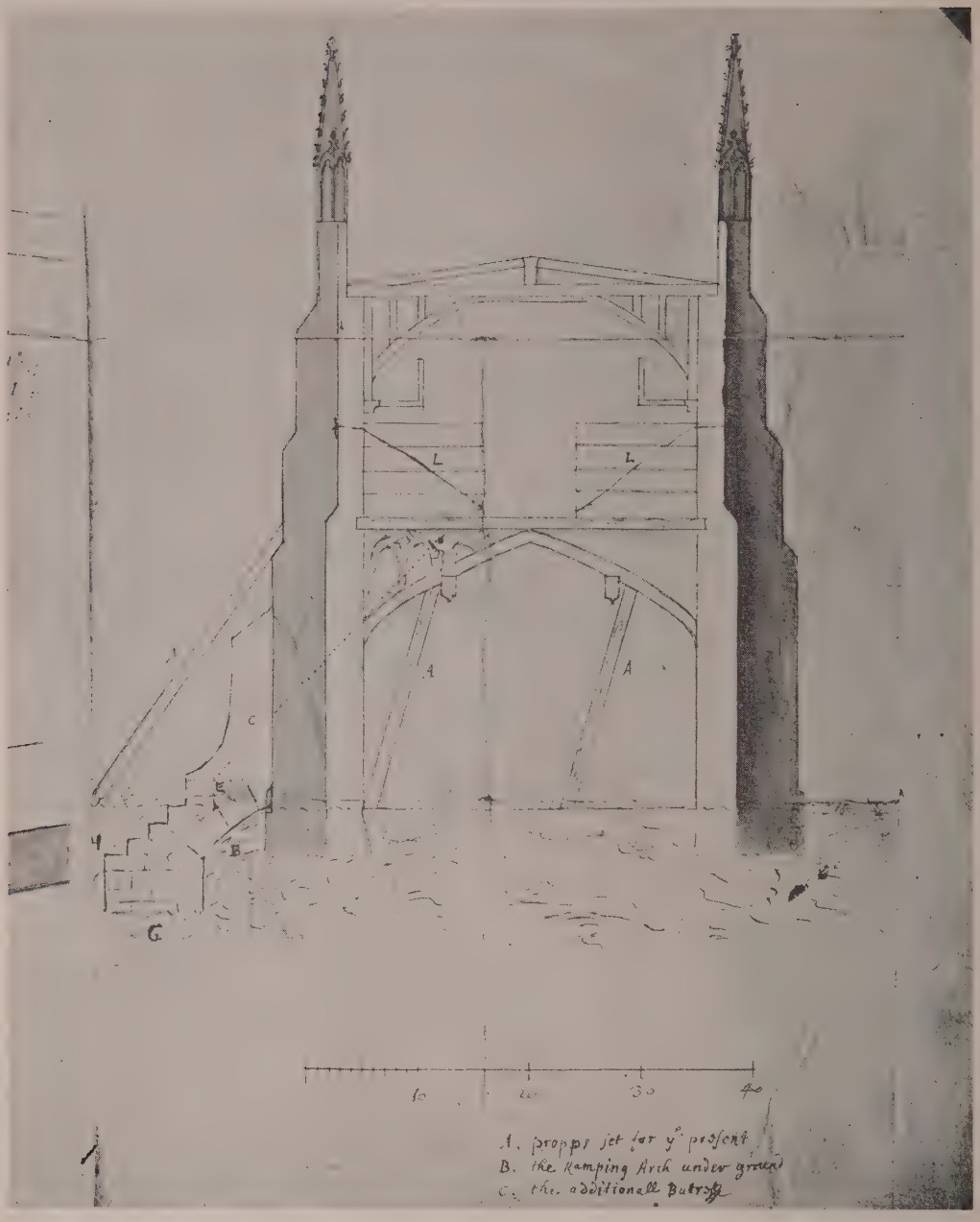
This injunction was strictly carried out, as may be seen in our photograph, which further shows that though the base mouldings of the old work were copied and carried round the new, with the omission only of the quatrefoiled and carved panelling between them, the new bases, and the upper courses of the additional buttresses, were built upon beds inclining inwards, so as to throw all the weight possible against the old buttresses.

This daring and unusual device succeeded perfectly well, and, with the exception of two or three modern additional tie-rods, inserted we believe about 1878, Wren's remedy, otherwise unaided, has shown its efficiency for 220 years.

In the interior of Duke Humphrey's Library he ingeniously carried diagonal ties from wall to floor beams, to help in supporting "the increased bulk of modern learning," through the centres of the double bookcases which divide that beautiful chamber into window bays.

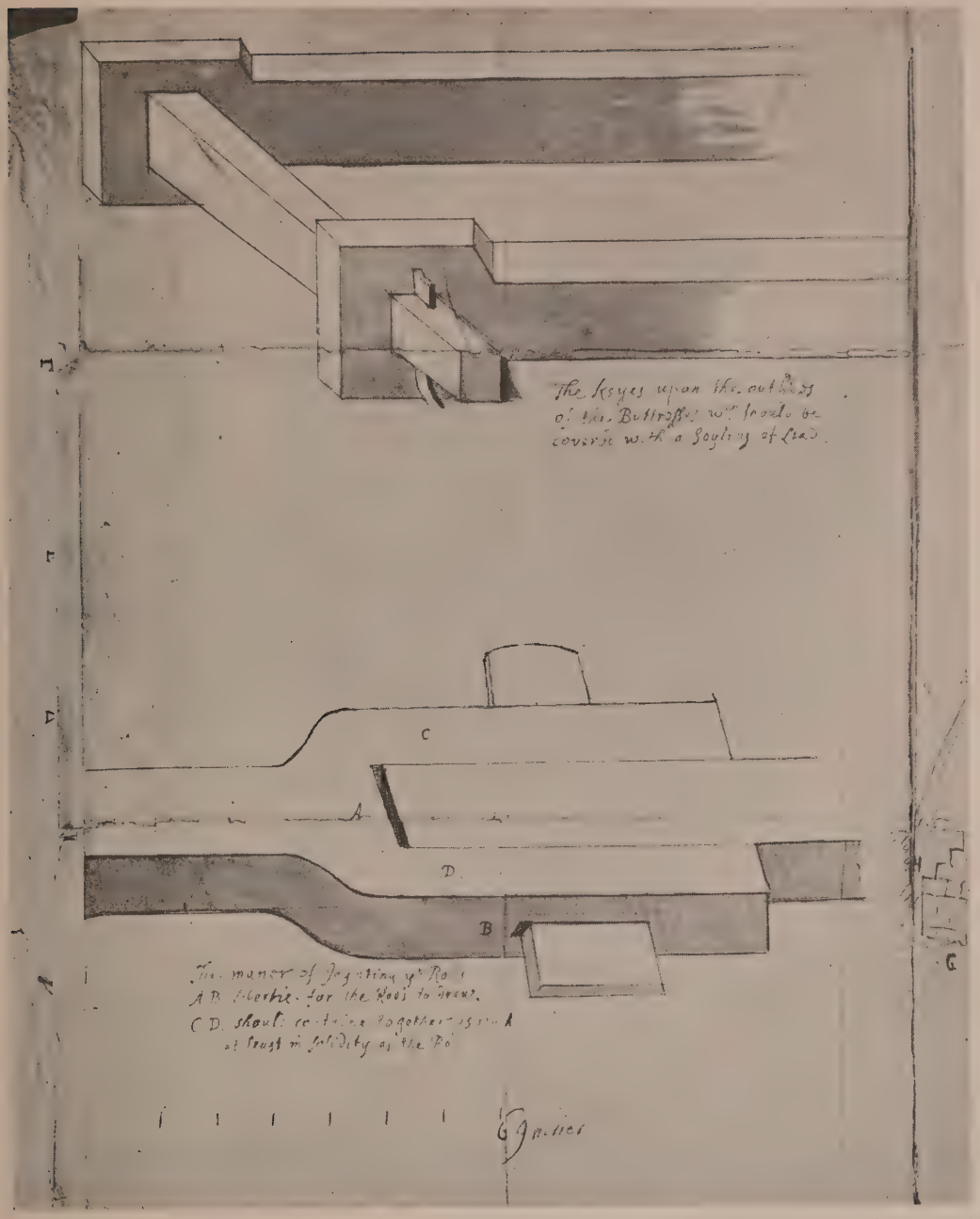
It is interesting to gather, both from Sir Christopher's letters and the workmen's report, that some thirty years before the date of this work he had applied some slighter remedies to the springers of the Divinity School vaulting, and to learn, from his letter of July 1700, that he advocates wedging up the cracks of that vaulting "with shells and plaister of paris."

The correspondence shows intimate and human relations between the University authorities and their workmen, and the great architect, and provides an added example, if that were necessary, of the versatility,



Section, returned with Sir Christopher Wren's Sketch Additions of Additional Buttress, Shores, etc. (Bodleian Library.)

NOTE.—As the result of excavation made in my presence in February 1923, I am able to certify that the ramping arches underground were carefully carried out and exist, the form of the added buttresses above ground, however, being made more conformable to Gothic type, as shown in our photograph.—E.W.



Working Drawing of Union of Tie-rod sent by Sir Christopher Wren. (Bodleian Library.)

accuracy of memory, quick perception, and engineering instinct of Sir Christopher.

BODLEIAN LIBRARY, OXFORD.

Sir Christopher Wren's letters, etc.

"An abstract of the Papers relating to the Divinity School and Library in Oxon., 20 Novr. 1700.

"Doctor Gregory, after having at Mr. Vice Chancellor's desire viewed the Divinity School and Library in February last, did report the state of that Building to Sr. Christopher Wren at London in March; and Sr. Christopher's advice concerning it, which he delivered to Mr. Vice Chancellor in Aprile following. This paper is marked I.

"The University Mason, Carpenter and Smith having made such enquyrys into the state of the said building as they were directed by Sr. Christopher Wren in the former paper, made their Report in May. It is marked II."

"The Workmen's Report concerning the Divinity School and Library, Oxon., 13 July, 1700.

"The Buttresses on the North side toward the Theater are every way greater and stronger than on the South side to which the building draws. The Clear of the building at the bottom is $30\frac{1}{2}$ foot, on the Library floor 30 foot ten inches, and where the roof is sett on 31 foot 1 inch.

"The North wall is perpendicular, so that all the giving is on the South side.

"The South wall leans outward or overhangs from top to bottom $7\frac{1}{2}$ inches, so that the beams are drawn out of both walls: to prevent which going further

about seven years ago, three of the four beams of the roof were anchored.

"The posts which rest on the Corbolls are about 2½ inches from the wall. But the flying off of the wall is more apparent from their being nailed to the wall; which Nails are now drawn.

"All these givings are greater toward the midle and less toward the ends of the building: the ends being kept in the buildings at each end.

"About seven or eight years since there were Gallerys hang'd on each side of this part of the Library that is over the Divinity School. One end of the feysses of the Gallery is lett in to the wall and the other hang'd by Irons to the Rafters of the roof. Each of the four great arches of the vault is cracked on the South rib, a little above the place where the cramps and bolts that were putt in by Sir Christopher Wren's Direction for sustaining the Springers of the arches doo reach.

"The Crack is continued all the length of the Divinity School, and since the last time that it was filled up with cement, about 7 or 8 years since, it is opened near an inch. Several stones of the vault all along by the crack are in hazard to drop; But the workmen deferr the wedging or pinning up the crack until by anchoring or some other means proposed by Sir Christopher Wren the further giving of the building is prevented.

"What the Workmen propose is to anchor the beams that ly upon the crowns of the Arches so that the anchors may take in the whole buttresses, by which means they pretend to keep the walls from flying further assunder."

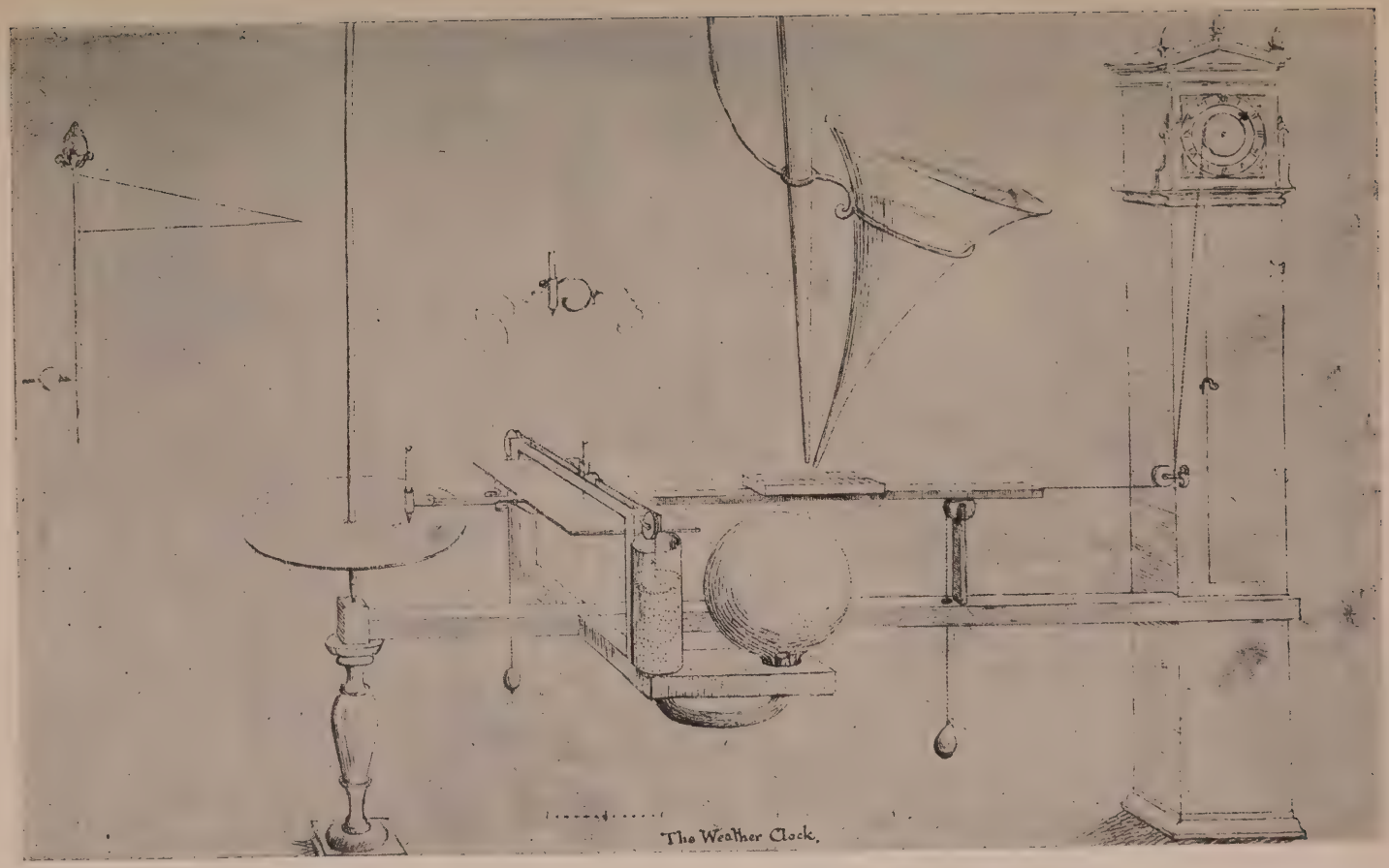
(Sent by Dr. Gregory to Sir Christopher Wren.)

CHRISTOPHER WREN THE ASTRONOMER. *By A. R. Hinks, C.B.E., M.A., F.R.S., Gresham Lecturer in Astronomy.*

THE brilliance of Wren's achievements as architect, and the splendour of the monuments to his genius that stand on every side in the City of London, are apt to blind us to the fact that by profession Wren was an astronomer. His academic training was in that ingenious company of experimental philosophers which met in Wadham College. He was a gentleman commoner of that College at fourteen; a Fellow of All Souls at twenty-one; was elected Gresham Professor of Astronomy at twenty-five, and Savilian Professor in the University of Oxford at twenty-eight. He was admitted to that Professorship on May 15, 1660; but two years later his friend Dr. Sprat had already to write that "The Vice-Chancellor did yesterday send for me to enquire where the *Astronomy Professor* was, and the reason of his absence so long after the beginning of term. . . . He most terribly told me that he took it very ill you had not all this while given him any account of what hindered you in the Discharge of your Office." Dr. Sprat tried to persuade the Vice-Chancellor that "the drawing of lines in *Sir Harry Savill's* school was not altogether of so great a concernment for the benefit of Christendom as the rebuilding of *St. Paul's* or the

fortifying of *Tangier*," but from 1663 onwards, when Wren was not building at Cambridge, he was building rather than lecturing at Oxford, and the Great Fire of London in 1666 called him finally from any further profession of Astronomy, to the great loss of that and kindred sciences.

Between the ages of fifteen and thirty, then, Wren was by training and profession an experimental philosopher. He then improvised himself, as the French say, into an architect, and the mystery of this transformation is doubtless examined elsewhere in this book. The purpose of the present chapter is to celebrate his fame as a man of science. When Eveyln, on July 13, 1654, " dined at that most obliging and universally curious Dr. Wilkins's at Wadham College. . . . He had above in his lodgings and gallery variety of dyals, shadows, perspectives, and many other artificial, mathematical, and magical curiosities, a way-wiser, a thermometer, a monstrous magnet, conic and other sections, a balance on a demicircle, most of them his owne and that prodigious young scholar Mr. Chr. Wren. . . ." In 1662 Evelyn (" Sculptura ") refers again to " that rare and early prodigy of universal science, Dr. Chr. Wren, our worthy and accomplished friend," as famous for dexterity in " the new and incomparable art of mezzotint engraving." Robert Hooke in his preface to the " Micrographia " (1665) declares that " the hazard of coming after Dr. Wren did affright me ; for of him I must affirm, that, since the time of Archimedes, there scarce ever met in one man, in so great a perfection, such a Mechanical Hand, and so Philosophical a Mind." Finally, in his preface to the second edition of the " Principia," Sir Isaac Newton speaks of Wren, Wallis, and Huyghens as " Hujus ætatis geometrarum facile principes," and gives



Design for Weather Clock by Sir Christopher Wren. From original MS. in Heirloom Copy of "Parentalia." (R.I.B.A. Collection.)

Oratio Inauguralis
Habita Londini in Collegio Greshamensi
Per Chr: Wren A. M.
Astronomiæ Professorem Electum
In Anno 1657, Ætat. 25.

Quanquam ex circumfusâ hac undique (Auditores Spectatissimi) tam Illustri Coronâ fœlix admodum mihimet Augurium facio, facile captandum fore Germanam illam (quæ candidis Mathematicorum Pectoribus innasci solet) Benevolentiam: ut ingenuè tamen quod sentio fatear, id mihi utpote Juveni, sublimen Astronomiæ Cathedram hodiè conscendenti quod in aëriâ Turris cujusdam Specula positis accidit: quibus etiamsi nihil visum effugiat, sed integrum Cœli Fornicem (subjectæ Planitiei in finitore quasi incumbentem) prospicere detur, & pulcherrimâ longè latèq Rerum Varietate afficiantur Oculi, Caligine tamen (ex inusitato Spectaculo) facile confunduntur: Neq mihi sanè (propter immensam Materiæ Copiam et Altitudinem) satis in promptu est, quid imprimis, quid ultimò (in hoc minimè vulgari dicendi Genere) Vobis expediam. Quin ea est præteriâ harum Scientiarum pressa et benè morata Oratio quæ Rhetoricæ solutam Loquacitatem nullo

A.

First Page of Inaugural Lecture of Sir Christopher Wren when he became Professor of Astronomy at Gresham College (at the age of twenty-five) in 1657. (R.I.B.A. Collection. Heirloom Copy of "Parentalia.")

to the first credit for having communicated to the Royal Society a true conception of the laws that govern the impacts and reactions of two bodies in collision.

We need go no further to prove that Sir Christopher Wren was esteemed in the very front rank of scientific men by his contemporaries—men of the world like Evelyn; students like Hooke; and the great man "qui genus humanum ingenio superavit." Yet if we look for some remains of his genius in the sciences we find almost nothing:—a sundial on the south front of the library at All Souls; a drawing of the weather-clock inserted in the heirloom copy of the "Parentalia"; a similar drawing in the Record Book of the Royal Society; the Inaugural Lecture at Gresham College; a solution of a problem proposed by Pascal on the geometry of the ellipse; and two or three demonstrations communicated to other people's books, as the theory of eclipses in Flamsteed's "Doctrine of the Sphere." Nothing survives identifiable of the improved object glasses that he made for telescopes, of the Lunar Globe that was one of the rarities in the King's Closet at Whitehall, of his self-recording anemometer and thermometer, or of the instrument to demonstrate the motion of the earth. The tragic destruction by neglect of the Royal Society's museum lost us the weather-clock and the recording rain-gauge, a model to demonstrate how a ship may sail against the wind, and a box-hive "designed to keep them warmer, and more safe; but especially to prevent their Swarming" (Grew's "Musæum Regalis Societatis," 1681). But it seems likely that Sir Christopher's own character was in part responsible for the remarkable absence of published work, by which alone could one judge impartially the real merits of his versatile genius in science.

"His communicative Temper in lending out Papers, never recovered; his peculiar Modesty, and Disregard of Publick Applause . . . prevented the Appearance in public, under his own Name, of many useful Tracts, and occasioned his not carrying on divers Discoveries to Perfection." So says the "Parentalia," founded, we think, on the striking passage in Dr. Sprat's "History of the Royal Society," wherein, having been "cautious to forbear commending the labours of any Private *Fellows* of the *Society* . . . seeing it would have been an inconsiderable honour to be praised by so mean a Writer," he felt obliged to break his rule in the particular case of Dr. Christopher Wren, for in turning over the Registers of the Society he perceived that many excellent things, whose first invention ought to be attributed to him, were "casually omitted."

The "Parentalia" does not hesitate to explain this omission by saying bluntly that the then Secretary of the Royal Society, Mr. Henry Oldenburg, "with disingenuity and breach of trust, communicated and clandestinely conveyed into foreign parts" discoveries of Wren that were afterwards published abroad under other names. It is therefore satisfactory to remember that Mr. Oldenburg was afterwards committed to the Tower for intelligence with the enemy; but so also was Samuel Pepys! We prefer, therefore, the conclusion of Dr. Sprat: "This is a short account of the principal Discoveries which Dr. Wren has presented or suggested to this Assembly. I know very well that some of them *he* did only start and design; and that they have been since carry'd on to perfection by the industry of other hands. I purpose not to rob them of their share in the honour: Yet it is reasonable, that the original *Invention* should be ascrib'd to the true *Author*, rather than the

Spectatissimos Viros

MATHESEOS PROFESSORES

Et alios præclaros in Anglia Mathematicos, ut hoc Problema solvere dignentur;

IEAN DE MONTFERT MAXIMÈ DESIDERAT.—

Propositio.

Extremis Ellipseos Diametris, Distantia centri ab aliquo puncto in Axi transverso, ubi Linea eundem secet sub Angulo dato, in numeris datis: Segmenta ejusdem Linex (si opus est) producta, & intra — transversum Axem & Ellipsin terminata, in Numeris invenire.

Datis { —— AC 1.00000 ; —— aC .76604 ; —— CB .50000 ; Angulo CBB .70° } quarantur { BD ; BF.

Spectatissimi Viri Problema sic solvere conatur CHRISTOPHORUS — WREN LONDINI IN Collegio GRESHAMI Astronomiæ Professor:—

ELlipsis data secetur in Cylindro recto, & sit Cin 2ª Figura) Aa Pp; & a puncto A secetur etiam Cylindrus circulo A a π; & ducatur AG tangens circulum in puncto A: quoniam ergo AG Parallela est ipsi a π & a π ipsi a p; ergo AG tangit etiam Ellipsin, ergo est in communi Sectione duorum planorum Circuli & Ellipsis: quare Linea FD (ducta a puncto B dato ad datas angulos) producatur in G; & cadat B β perpendicularis in Aκ; & a puncto B ducatur β G producta in δ, secans Circulum in φ. δ; ducantur φ F, δ D parallela ipsi β B. Dico, puncta F, D Linea G D esse etiam in Ellipsi.

Quoniam punctum φ est in circulo, ergo est in Superficie Cylindri, & quoniam Linea φ F parall: est ipsi β B & β B ipsi κ C, ergo φ F est in superficie Cylindri: G B autem erat in plano Ellipsis, ergo F in Superficie Cylindri & in plano Ellipsis est in curva Ellipsis. Similiter demonstratur punctum D esse in Ellipsi.

Aliter in plano.

Ducatur K G tangens Ellipsin (in tertia Figura) in puncto A, & producatur D F in G, & producta P A, ponatur Aκ = a C, & ducatur circulus A π a, & ponatur AC. AB :: Aκ. Aβ; per punctum autem β ducatur δ G secans circulum in δ. φ; & ducantur φ F. δ D parall: ipsi AC secantes Lineam D G in punctis F, D. Dico puncta F & D esse etiam in Ellipsi.

Ducatur a π parall. ipsi A G, & producantur utrinque φ F, δ D in μ ν & M, N: quoniam H μ = Aκ, & HM = AC, & AC. AB :: Aκ. Aβ; & AB. HF :: Aβ Hφ: ergo AC (= HM). HF :: Aκ (= Hμ). Hφ: ergo AC. FM :: Aκ φ μ Sed Quadrat. AC. Quadr. FM :: Quadr. a C (= Quadr. aκ). rectang. AMP (= rectang. a μ π = Quadr. μ φ) ergo punctum F Linex D G est in Ellipsi. Similiter demonstratur punctum D esse in Ellipsi. ergo ex utrovis Schemate patet.

The Problem proposed to English Mathematicians by "Jean de Montfert" (Pascal), from MS. inserted in the Heirloom Copy of the "Parentalia." (R.I.B.A. Collection.)

Solutio Problematis.

In triang. enim rect. ABG, datis {AB, ABG} Quæ {AG, BG} runtur. Deinde quoniã

AC. AB :: Aκ (= Cρ). Aβ ; ergo

In triangulo rectangulo {Aβ} Quæ {βG, Aβ G, datis {AG} runtur {Aβ G.

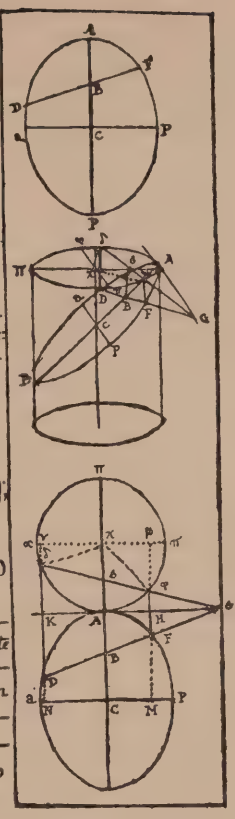
Deinde ducantur κφ & κδ, sic

In triangulo κφβ, datis {κφ, κβ, κβφ} Quæritur βφ Similiter

In triangulo κβδ, datis {κδ, κβ, κβδ} Quæritur βδ Postremo

Gβ. βφ :: GB. BF Similiter, Gβ. βδ :: GB. BD. —

Quoniam ad Hypothesin Planetarum Ellipticam clarissimi Viri — Problema pertinere videtur (cui forte in Animo est medium Planetarum motum non circa Focum Ellipseos sed aliud punctum — quoddam punctum disponere:) Liceat igitur ejusdem generis Problema, manifestæ loco vicissim proponere.



Aream datam Semicirculi dati vel Ellipseos datæ, ex quocunq; puncto Diametri cujuscunq; etiam si libet productæ, in data ratione secare.

Scilicet datâ Areâ mixtilinei Trianguli Πβδ, vel PBD in Ellipsi, angulum πβδ vel PBD invenire.

Ejusmodi Problema a peritioribus Geometris proposuit — Olim KEPLERUS [in Commentariis de motibus MARTIS parte 4.] quippe Hypothesis Elliptica KEPLERIANA (illa scilicet — Quæ per areas partium Ellipseos medio motui Planetarum analogas, Anomaliam coæquatam rimatur) absque — hujus Problematis solutione penitus mutila est, — utpote genuinâ methodo destituta, quâ ex dato medio Planetarum motu, Motum verum a priore indigare possimus.

Solvitur a nobis Problema Geometricè, si modo ea concedatur Geometrica Solutio, quæ per intersectionem rectæ Lineæ & curvæ cujusdam, cujus omnia puncta sunt nota, quod proponitur efficit. Neque unam solùm, sed varias esse curvas, quibus variis modis Circulus in data proportione secari possit demonstravimus.

Rogo igitur præstantissimos in GALLIA Mathematicos ut PROBLEMA KEPLERIANUM solvere dignentur, — Numericè quidem si fieri possit, saltem Geometricè.

Sir Christopher Wren's Solution of the Problem, with the restatement of Kepler's Problem, proposed in reply as a Challenge to the Mathematicians of France.

Finishers. Nor do I fear that this will be thought too much, which I have said concerning him: For there is a peculiar reverence due to so much excellence, cover'd with so much modesty. And it is not Flattery but Honesty, to give him his just praise; who is so far from usurping the fame of other men, that he endeavours with all care to conceal his own."

In discussing the cause why Sir Christopher published so little, we must not forget either, that the few years in which he was free from engrossing public duty were also years of great public disquiet. When appointed to Gresham College in 1657 he was able to deliver that inaugural address which has survived in Latin and English, without any clear indication whether it was delivered in one tongue or in both, as were his earlier lectures in the College. On that occasion he could "spy some of the politer genii of our age." But in the following year, in the confusion after the death of Cromwell, his cousin Matthew Wren, going to visit the Gresham Professor of Divinity, "at the gate was stopped by a man with a gun, who told me there was no admission upon that account, as the College was reformed into a garrison. Then changing my pretension, I scarce got permission to go in to Dr. Goddard, who gave me assurance enough that none of your colleagues intend to appear this term unless the soldiers be removed, of which there is no probability." This was in October 1658, and Wren remained at All Souls. There are no records of Gresham College surviving from that period, and it seems impossible to discover how many courses of lectures Sir Christopher delivered there. We know from the "Parentalia" that the manuscript of a lecture "De corpore Saturni ejusque phasibus Hypothesis" was in the possession of William Jones, Esq.,

and would do much to recover it, for Derham says that "by a thirty-six-foot glass he drew many exact pictures of Saturn, not only of his Ansulæ, but of his Spots, and attained to a Theory of his Rotation, and various inclination of his Body." We surmise that he had a telescope mounted at Gresham College, because his friend Dr. Sprat wrote from London to Oxford, about the same time as his cousin, a letter which might have got the good bishop into trouble: "This day I went to visit Gresham College, but found the place in such a nasty condition, so defiled, and the smells so infernal, that if you should now come to make use of your tube, it would be like Dives looking out of hell into Heaven. Dr. Goddard of all your colleagues keeps possession, which he could never be able to do had he not before prepared his nose for camp perfumes by his voyage into Scotland, and had he not such excellent restoratives in his cellar." But in the brief catalogue of Tracts printed in the "Parentalia" we find "Phases Saturni 1649—1656," so that it is more probable that Wren made these observations with a "thirty-six-foot glass" at Oxford, perhaps where Evelyn found him in 1664, "in the Tower of the Scholes, with an inverted tube or telescope, observing the discus of the Sun for the passing of Mercury that day before it, but the latitude was so great that nothing appeared."

One more title from the "Parentalia" raises vain regrets: the "Prælectiones Greshamenses in astronomiam Kepleri." In his inaugural lecture Wren declared that "here I should not slightly mention that great foreign wit, Kepler, the compiler of another new Science, Dioptricks . . .," though he makes the curious suggestion that we should reverence Gilbert for "giving occasion to Kepler (as he himself confesses) of introducing Magne-

ticks into the Motions of the Heavens," and consequently of building the elliptical astronomy. This is one of the few passages in the original draft of his Inaugural Lecture of real astronomical interest: the rest is rather padding for the "politer genii": He will not praise Hercules (as they say) by troubling them with a tedious encomium of astronomy, but leave this to the Dutch writers! "It were pedantick to tell of our erected countenances, given us on purpose for astronomical speculations. A time would come when men would be able to stretch out their eyes as snails do, and extend them to fifty feet in length, by which means they should be able to discover ten thousand times as many stars as we can"—rather poor stuff suddenly rising into this most interesting conclusion: "and find the Galaxy to be myriads of them, and every nebulous star appearing as if it were the Firmament of some other World . . . bury'd in the vast abyss of intermundious vacuum." What would we not give for fuller knowledge of what was in Wren's mind when he wrote this passage so strangely before its time, so strongly suggestive of the island-universe theory of spiral nebulæ to-day?

We have ventured to call the English draft rather poor stuff in general. A cursory examination of the Latin version printed by Ward in the Lives of the Gresham Professors suggests that the Latin is the more finished and the authentic text. It would be a pious act to translate and print this text on the celebration of the Bicentenary, for the English version in the "Parentalia" is that by which Wren's lecture style is known generally, and perhaps misjudged.

Such are the impressions which one derives from a cursory study of the very scattered evidence. To do justice to Wren's memory it should have been possible

Church of St. Lawrence Jewry. From a Drawing by T. Malton, 1783.

Courtesy of St. Lawrence University
Donald J. Hanson, 1982

to engage months earlier the interest of a scholar well versed in Restoration Latin, with a competent knowledge of mathematics and astronomy, a special acquaintance with the state of those sciences in that most instructive but difficult period between Kepler and Newton, an antiquarian taste in mechanical and instrumental devices, and abundant leisure to unravel the extremely tangled statements of Wren's contemporaries and successors.

The present unworthy successor of Sir Christopher Wren in the honourable office of Gresham Professor of Astronomy has none of these qualifications. He can but indicate some of the fascinating lines of inquiry that are opened up by a hurried survey, undertaken at short notice.

Consider, for example, the reply to the problem set by Pascal to the English mathematicians. One should search whether anything is known independently of this sporting challenge, in which the so-called Jean de Montfert is said to have risked the sum of twenty pistoles, which, however, he never paid to the author of the solution; or so says the "Parentalia." Why was it never paid? "By some chicanery," says the "Parentalia," "it was dishonourably withheld." But one would like to know a little more of the matter. The proposition, as set out in the MS. reproduced herewith from the page inserted in the heirloom copy of the "Parentalia," says clearly that the challenge is "segmenta ejusdem lineæ in numeris invenire," which Wren does not do, though he gives two neat geometrical solutions by which they could easily be found. Did Pascal withhold the promised pistoles on the ground that the answer was not in the terms required, and if so, why did not Wren complete the solution by five minutes' calculation? And why did Wren return the challenge

by propounding to the French a problem that had been proposed by Kepler? Was it because the original problem set by the French was really implicit in Kepler, as the passage beginning " Quoniam ad Hypothesin . . ." may imply, though the present commentator is not very sure about it? Was it, therefore, in irony that Wren set them another problem that Kepler had left unsolved? These are interesting questions worth the attention of some competent scholar on this occasion.

Or take another case. The " Parentalia " quotes from Ward a " Catalogue, with Vouchers of several of the Works of Sir Christopher Wren . . ." in which is :

> " 6. A Method for the Construction of solar Eclipses. This was discovered by him in the Year 1660, and afterwards published by Mr. Flamsteed, in his ' Doctrine of the Sphere ' ; and has now for many Years been generally follow'd, as the most concise and plain. See Sir Jonas Moor's System of the Mathematicks, London 1681, Quarto."

In the Preface to this last work it is said how Sir Jonas died before he had completed the work which he designed for the use of the Mathematical School in Christ-Hospital, and it was finished by friends, with some loss to the bibliographical refinements. The Doctrine of the Sphere is mentioned on the title-page without sign that it is by another hand than that of Sir Jonas, but the Preface assigns it to Flamsteed. The " Index or Contents " makes no mention of it at all, but it appears in Volume I after page 288. It has a separate preface written in the first person with no indication anywhere of the name of the author, though references to Greenwich and to Derby confirm the attribution in the first preface to Flamsteed. The writer

explains that he had discovered in 1676 a graphical method of calculating eclipses, which he sent to Sir Jonas Moore, who communicated it to the Royal Society.

> "It hap'ned Sir Christopher Wren was there present, who having viewed the Figure only, told him, that himself had known the same method 16 years a gone, and to assure him of it, sent him soon after a like Projection neatly drawn on Pastboard, and fitted with several ingenious contrivances of Numbers and Scales for the Construction of Solar Eclipses in our Latitude. This Sir Jonas brought down to me, then Labouring under some Distempers, to Greenwich, whereby I was satisfied that the honour of the first Discovery of this useful invention was absolutely due to Sir Christopher Wren, whom of all Mortals I believe to have been the first that knew how to find the Times of the Beginning, Middle, Digits then darkned, Inclination of the Cusps at any Phasis, and End of a Solar Eclipse, without the Calculation of Parallaxes."

In other words, Wren was the first to discover the graphical method of computing eclipses that with some modifications, due to much-improved tables, remains by far the most instructive, though not the most numerically accurate way of calculating the circumstances of an eclipse or occultation at a particular place, and is in use to-day for the graphical prediction of occultations. And this is an excellent example of the way in which Wren's work is hidden away in other people's books, partly because he was so little inclined to publish himself, and so generously disposed to others.

For a third instance of the difficulty in following out

the precise share of Sir Christopher Wren in a scientific undertaking, let us turn to the history of the Royal Observatory at Greenwich. Phillimore's biography says that Wren was its architect, but the " Parentalia " makes no mention of the Observatory—at least, none in the index, or so far as I can discover. The original inscription over the gate said, " Curante Jona Moore Milite," and in the great mass of correspondence with Flamsteed preserved at the Royal Observatory there is little with Wren, nor much indication that he had a great deal to do with the Observatory and its instruments. This is all the more strange since Wren was closely associated with Moore, and very shortly succeeded him as Surveyor to His Majesty. Wren was above all other men in England at that time practically conversant with the construction of large instruments, having made them himself, and being in particular interested in the grinding of objectives. Wren was reputed the Archimedes of his age, was in the habit of throwing off suggestions on all kinds of scientific matters, is credited with the first idea of many instruments that were afterwards brought into use by others, was in the full tide of activity hard by; and yet there is no evidence that he took much interest in a project that he might have been expected to make his peculiar care and delight. This is the greatest puzzle of all.

I would make a small contribution to its complexity. Turning over one day, by leave of the Pepys Librarian at Magdalen College, Pepys' fascinating albums of prints, I found a set of engravings of the Royal Observatory, with a ground-plan showing outside the walls an octagonal figure, labelled " Puteus profunditatis 120 ped. cum Tubo pro Observ. Parallaxis Terræ," while another print gives a carefully drawn section of the well,

with tube and spiral stair leading down to a recumbent figure under some sort of eyepiece carried on a frame: a zenith telescope, in fact, such as was designed for the detection of stellar parallax, but in the hands of Bradley detected instead the phenomena of aberration and nutation. This is labelled, however, "Puteus 100 pedum ad Parallaxes Terræ observandas. p^r paratus."

Now in Ward's Lives we read of the Monument that "the learned and ingenious architect built it hollow, that it might serve as a tube to discover the parallax of the earth, by the different distances of the star in the head of the Dragon from the zenith, at different seasons of the year. But finding it was liable to be shaken by the motion of coaches and carts almost constantly passing by, he laid aside that thought." And later, of St. Paul's Cathedral: "Here Sir Christopher designed to make use of the hollow in the great staircase of the south side, being in height 96 feet 10 inches, for the like purpose as the Monument, by the assistance of the great telescope presented to the Royal Society by Mr. Huygens; and his kinsman, the ingenious mathematician, Mr. James Hodgson, was to have made the observations. But finding that instrument, which is 123 feet long, too large for his use, and not being able to procure any other of a proper size, he was prevented likewise from the execution of that design."

The well at Greenwich was 120 feet deep, crowned with a small building some eight feet high. In fact, the dimensions were exactly those proper for the use of this objective. In prints of the Royal Observatory preserved at Greenwich (which seem to be from unfinished plates of the same set that Pepys collected in part), the little turret covering the well is clearly shown in its right place. But there is not now at the Observatory

any record or knowledge of the well. Its site in the garden of the Astronomer Royal has been excavated without result. Was it ever made, or are the ground-plan and the perspective view both fictitious, or rather indicative of plans that were not carried out? If it was ever made, who paid for it? That is the question put to me by the Astronomer Royal, and from what we know of Flamsteed's difficulty in getting money, it is almost conclusive. But in either case, does it not seem probable from the above history that Wren had more to do with the design of Greenwich than is generally allowed?

In face of these major problems we must leave for an ampler leisure the fascinating pursuit of the many questions that suggest themselves when we read in Sprat or Derham or in the "Parentalia" the long list of inventions attributed to Sir Christopher. If his weather-clock and his self-recording rain-gauge ever worked, they were nearly two centuries before their time. But the drawing of the weather-clock reproduced from the "Parentalia" looks more like a project than an instrument that had been made to work. And so it may have been with other of his inventions. There is a wide and apparently unworked field here for the instrumental antiquary. May the occasion which we now celebrate inspire some worthier inquiry into these curious matters.

SIR CHRISTOPHER WREN'S CONTRIBUTIONS TO BIOLOGICAL SCIENCE. *A Note by Sir William M. Bayliss, M.A., D.Sc., LL.D., F.R.S., Professor of General Physiology, University College, London, Hon. Fellow of Wadham College, Oxford.*

ACCORDING to Sprat's "History of the Royal Society," published in 1667, it was Christopher Wren who was "the first Author of the Noble Anatomical Experiment of Injecting Liquors into the Veins of Animals." The passage continues (I quote from the third edition, p. 317): "An Experiment now vulgarly known; but long since exhibited to the Meetings at Oxford, and thence carried by some Germans, and published abroad. By this operation divers Creatures were immediately purg'd, vomited, intoxicated, kill'd or revived, according to the quality of the Liquor injected. Hence arose many new Experiments, and chiefly that of Transfusing Blood, which the Society has prosecuted in sundry instances, that will probably end in extraordinary Success."

More details of the experiments will be found on p. 128 of the first volume of the "Philosophical Transactions of the Royal Society" (1665–6), where

complaint is made that in " books printed beyond the seas " the origin of the method is ascribed to others than the " true Inventor." From this account and from that given by Boyle in his " Usefulnesse of Experimentall Philosophy " (Second Edition published at Oxford in 1664, pp. 52 to 55 of Part II), it appears that the idea was due to Wren. He suggested the experiments to Boyle, who had the instrument made. This was a quill, attached to a syringe. Wren then performed the experiments before some of the Oxford Meetings of the Royal Society, which were held at that time in the Warden's lodgings at Wadham College. In the collected "Works" of Boyle, published in 1772, the description will be found in Vol. II, Part II, Essay ii, pp. 88 and 89 (called " Postscript "). Opium was the first material tested and found to have its characteristic effects.

A further point of interest as showing Wren's connection with the biological sciences is that he drew many of the illustrations to Willis' " Cerebri Anatome," published at Geneva in 1680. As the author of the book says, " eruditissimis suis manibus delineare non fuit gravatus." Wren was also one of the first to use the microscope for investigating the structure of insects. This instrument had indeed only recently been invented.

SIR CHRISTOPHER WREN MERCHANT ADVENTURER. *By Sir William Schooling, K.B.E.*

FROM June 1679 till March 1684 Sir Christopher Wren was one of the "Adventurers of England trading into Hudson Bay." In other words, he was a shareholder in the Hudson Bay Company, which received its Charter from King Charles II in 1670, and which continues to the present day. The first Governor was Prince Rupert, with whom Wren had dealings about the Company's affairs. For four years, from November 1679 to November 1683, he was one of the Committee of seven who, with the Governor and the Deputy Governor, directed the affairs of the Company.

The Adventurers were declared by Charter to be the "absolute Lords and Proprietors" of all the territory, the waters of which drained into Hudson Bay. The nature and extent of this vast domain were almost entirely unknown, and strange stories were in circulation in London about the secret workings of the Committee and their dealings with the Indians, who were erroneously thought to be great potentates, like the native princes of India.

Wren was a constant attendant at the frequent Committee meetings that were held, and received 6*s.* 8*d.* for each attendance, always provided he was not late in arriving. The Governor paid little attention to the

Company's affairs, and only gave his assistance on important occasions. The most active direction was in the hands of the Deputy Governor, whose place during his absence Sir Christopher, while a member of the Committee, was invariably chosen to fill.

Wren's holding in the Company's stock commenced with £200 in 1679, and was increased by subsequent purchases to a total of £1200 in 1683, at which date the total stock was £10,500 and the number of shareholders about thirty.

In those early days, when one or more ships were sent to Hudson Bay each year with an "outfit" for trading with the Indians, the Company was continually under the necessity of borrowing money to provide the merchandise for trade. The Directors, Wren included, frequently lent substantial sums for this purpose, and Wren was appointed on various occasions to interview the then Lord Mayor and other people of importance in reference to loans.

When Prince Rupert died at the end of 1682, and the Duke of York—afterwards James II—was elected the Governor of the Company, it was ordered that the Deputy Governor, Sir Christopher Wren and two other members of the Committee

> "doe attende his Royall Highness with the notice of this Election, and the Right honourable the Earle of Craven a Member of this Company is Desired to Introduce yem to his Royall Highness humbley to Desire his gratious Acceptance of the Government and that he wold be pleased to take the Company under his Patronage & protection."

In the active work of the Committee, which included attention to many comparatively trifling details, Wren

All Hallows Church, Corner of Bread Street. From an Engraving by J. Skelton from a Water Colour Drawing by J. Coney, 1812.

took an active part. It is reported that he went on board the " Prudent Mary "

> " at ye Red House by the Invitation of Capt Greeneway Comander, and gave 40s. to ye ships Crew wch is to be reported to ye next Committee for theyre allowance."

He was present at a number of Committee Meetings when charges were made against Governor Bayly of York Fort, who, however, died before the charges were heard. After Bayly's death it was resolved by the Committee :

> " That he be buryed at ye charge of ye Company in the Church of St. Pauls Covent Garden in wch parish he was borne. And the care of his funerall is recomended to ye sd Mr. Walker being a member of ye Company and he is desyred to see the same decently performed, taking to his assistance Mr. James Shaw of Covent Garden who hath tendered his helpe therein, his sonne being in ye service of ye Company in Hudsons Bay. The charge of the funerall is not to exceed 20 lb. The tyme of the funerall to be upon Thursday next by Torch light. The Committee and such of ye Company who please to be there, And all the officers of ye ship Jno & Alexander wth whom he came home are to be Invited to attend ye Corpse."

In those days everybody concerned with the Company was required to take oaths of various kinds. The Governor, the Deputy Governor, the members of Committee, the shareholders and all the servants in their various degrees were required to swear allegiance and loyalty to the Company. It is on record that

> " Sr Christopher Wren having been desyred to overlooke & correct ye forme of an Oath to be given to those who shall enter into ye service of ye Company, hath produced it to this Committee who have allowed of ye same, and Mr. Hayward is desyred to get severall coppys of ye Same printed yt they may be bound up together and every particular person may signe his particular paper."

One matter that doubtless interested Wren, who had been Savilian Professor of Astronomy, was a resolution that :

> " Three Mapps of the bottome of the Bay be disposed as followeth : One to Captain Draper, one to Capt. Cobbie, and the third be reserved for the use of the Company or delivered as they shall hereafter direct."

It was subsequently resolved to pay

> " to Jno Thornton mapp maker ye Summe of 8 lb. in full for his worke and he is to fill up ye names of ye Rivers &c. into ye bargaine."

During Wren's tenure of office the arms of the Company were painted for the Committee Room, and engraved for a seal. In his time also orders were given for supplies of the Company's flags, though it does not appear from the records whether or not the flag decided upon at that time was the famous Union Jack with the letters H.B.C. which has been so conspicuous a feature of lonely forts and busy cities in Canada up to the present day.

The duties of the Committee were taken very seriously, and any deviation from the standards exacted

was at once penalised. Thus, in 1680 two members report :

> " what hath been done by ye Committee at Gravesend, and perticularly that they have discovered by Lers. they opened there that Mr. Phipps is obnoxious to Just exception & therefore they moved he should withdraw, wch he doing Mr. Craddock read such Lers as he had brought from thence and gave such farther informacion as he had agt him, and thereupon It is ordered that ye consideracion of what had been now communicated should be adjourned till a full Committee & in ye meane tyme that Mr. Phipps should forbeare ye Committee."

(Mr. Phipps was a member of the Committee.)

A further record is :

> " Upon ye reading of certaine Lers wch were written by Mr. Phipps and designed by him for ye Hudsons Bay and Intercepted at Gravesend, and upon hearing what defence he could make, This Committee not being satisfied therewith Doe Order that ye sayd Mr. Phipps be excluded from being any longer a member of this Committee, he having not behaved himself therein according to the trust reposed in him."

Not unnaturally, Wren was invited to inspect various houses that the Company intended to rent or buy, and it was even ordered

> " that such shutters, bolts & locks be made to the Warehouse as Sr. Chris: Wren shall judge fitt to be done."

The Committee gave detailed attention to ordering the outfits and continually interviewed tradesmen in reference to supplies. On several occasions gun-makers appeared before it, to whom the Committee complained of the inferior quality of the guns supplied. Problems connected with shipping and insurance were repeatedly dealt with, and we have such a record as that of the determination :

> " to build a new ship of 35 Tunn for to goe into ye Bay in ye service of ye Company and he proposes to build her 34 foot by the Keele : 14 foot & ½ broad that shall not in her draught of water exceed 5 foot Loade she shall be built of 2 Inch ½ plank without board she shall have no sapp timber in ye Decks And ye price he demands is 5 lb. per Tunn."

In the archives of the Company there is a volume which gives brief records of nearly the whole of the more than 600 voyages which have been made to and from Hudson Bay by the Company's ships. It is one of the most astounding series of voyages that has ever occurred, and we cannot but wonder that the great majority of, in these early days, tiny vessels, should have successfully overcome the difficulties of the ice-bound Straits and Bay.

A man with Wren's imagination, looking at the maps, seeing and approving of the ships, talking with the captains, the governors of the posts and others who could give him first-hand information about the conditions in the desolate regions round the Bay, must have obtained a vivid realisation of the dangers and difficulties of their task. Even he could not have realised the significance of these early efforts for the development of a large part of Canada, nor have foreseen, as happened

Bow Church and the Houses on the North and South Sides of Cheapside, looking towards the Poultry. From an Engraving by T. Malton, 1798.

on more than one occasion, that the Hudson Bay Company would be fundamentally instrumental in retaining Canada for the British Empire.

In his day and at other times there was trouble with the French. Fort Nelson on Hudson Bay was taken by them, and later the Bay was to be the scene of a vigorous battle. From time to time the forts changed hands, but in the end their possession was affirmed to the British.

Another difficulty with which the Company was much concerned in about 1682 was repeated attempts by what the Company called " Interloping " vessels to interfere with the trade to the Bay, of which the Company had been granted a monopoly by Charles II. On one occasion it was ordered that :

> " Mr. Craddock & Mr. Hayward be desired immediately to hire a coach for Windsor and repaire to his highness Prince Ruperte & acquainte him that this Committee is certainely informed that there is a Interloper now intended for Hudsons Bay & what charges they are at to place to the Comp[a] Accte."

As a result of this consultation with Prince Rupert " a Ketch of aboute 50 Tuns burthen " was bought and despatched " to the Bay with all expedition " in order to warn the Company's servants there of the " Interloper." It is subsequently recorded that this impudent interloper got no farther than Land's End.

During Wren's lifetime at least three Institutions were formed the influence of which has lasted to the present day, and which, each in its own way, was representative of the new spirit of inquiry which was then prevalent. The Royal Society for Improving Natural Knowledge was founded in 1660 or earlier, and

in 1681 Wren was elected President—probably the only instance of a President of the Royal Society being a Director of the Hudson Bay Company.

New countries overseas were attracting the attention of the civilised world, and even in Wren's days it was supposed that the best route to China and Japan lay across the Atlantic. The Hudson Bay Company played a long and conspicuous part in this development of new lands, and Wren, as we have seen, was closely connected with it for some years.

In order that the King's ships in particular should be able with greater safety to navigate these uncharted and newly discovered seas, the Royal Observatory was established at Greenwich in 1675 for the purpose of making observations for the Royal Navy. Wren was a member of the Committee appointed by the King to consider this subject. The Committee elected as one of its members John Flamsteed, who became the first Astronomer Royal. Sir Christopher was charged with the preparation of the plan of the building and the selection of a site. He chose the hill in Greenwich Park where the famous Observatory still stands. Thus we see that, apart from the special activities with which the name of Sir Christopher Wren is most closely associated, and upon which his fame mainly depends, he was in one way or another intimately associated with some of the principal movements of his day, the effect of which has continued to the present time.

St. Paul's Cathedral. By T. Malton, 1792. From the original Water Colour Drawing in the possession of Messrs. Ellis & Smith.

St. Paul's Cathedral. By T. Malton, 1792. From the original Water Colour Drawing in the possession of Messrs. Ellis & Smith.

THE CROSS AND THE DOME (EPILOGUE)

By S. A. Alexander, M.A., Canon and Treasurer of St. Paul's Cathedral.

IN Christopher Wren, whose bicentenary St. Paul's has a special right to celebrate, we have one of those many-sided geniuses who are perhaps less rare in the history of Italy than in that of England. With his versatile and far-ranging abilities, he would, no doubt, have achieved a very high reputation in many fields of labour if he had permanently given to art, experiment or research powers which men of note had already described as "miraculous"; and yet his main contribution to history is that of an architect of fertile gifts, large and original conceptions, and deeply religious feeling. The churches which he built within the City of London, remarkable as they are both for number and variety, represent but a small part of the works for which he was responsible during a long and busy life. It is, however, as the builder of St. Paul's Cathedral that we are now regarding him. While he was engaged on the very puzzling and complex task of restoring the old St. Paul's, fortune gave him the golden opportunity, which has seldom fallen to any man's lot, of replacing one of the noblest buildings in Europe with a successor

which should be not unworthy, in either a religious or an artistic sense, of sustaining a great tradition.

It may well be that, in building as he did, Wren accepted some of the risks which usually attend the course of creative genius. When I am called upon, as I sometimes am, to defend him against the criticisms to which the present troubles in the fabric have given occasion, I think his Cathedral can be left to answer for itself; but certainly we ought to try to understand the conditions under which he worked and the difficulties which he had to face. It is always as easy to be wise after the event as it is to prophesy when you know. The Great Fire of London transformed a vast area of the City into a scene of utter desolation filled with fallen churches and with the ruined shops and houses of thousands of homeless citizens anxious to return. As Wren surveyed the wilderness of St. Paul's Churchyard, there was one thought which rose in his mind as the master-thought of all his dreams. It was that of a Dome. He must have a Dome. The Dome would be not only the central fact in the landscape of London—of the new London as he planned it; it would also make possible great acts of public worship. Wren was a religious man—a democrat, if I may so say, in religion; the mediæval type of Cathedral had never been congenial to him; he would build for a multitude, or he would not build at all. Like Colet, greatest of the Deans of St. Paul's, he had a tender heart for the common people. So the Dome soared over the City, more beautiful than any that Florence, Rome or Paris had seen; and yet even then its builder's purposes were thwarted. The citizens hastened back to remake their homes as they chose, and the scheme of a new London—the vaunt of Wren's epitaph, "Builder of this

City "—came to naught. Within, mediævalism prevailed, and, in spite of all his protests, a screen was erected at the entrance of the Choir. Not for a century and a half was his vision of a great multitude worshipping week by week beneath the Dome to find its realisation.

The tree is known by its fruits, and the spiritual significance of Wren's work can only be judged by its definite results. If it is so tested, it will not be found wanting. St. Paul's is the symbol and expression of the best characteristics of the religious mind of the British people—its directness, its simplicity, its truthfulness, its width of outlook. I have only met with one man of distinction who, fascinated by the undoubted magic and inspiration of the Gothic Cathedral, declared that to him St. Paul's made no very powerful appeal as a home and centre of worship. For most of us the reverse is true. The spirit of devotion seems to be natural to the building, and one is often impressed by the way in which even the occasional vulgarity or conceit of a preacher out of harmony with his surroundings is subdued and silenced by the majestic serenity of the Dome. Wren was a man of lofty character who spent much of his leisure time in the study of the Bible; and all this has given to his Cathedral a spiritual value which has only been heightened and deepened by the experiences of the war, and by the wonderful scenes on which during the last few years the Dome has looked down. We cannot but think how rejoiced he would have been to know not only that countless thousands would year by year throng his aisles and worship within his walls, but that the memories and aspirations of his fellow-citizens in every part of the world would be setting, like a constant tide, towards the Parish Church of the British Empire.

But the Dome was not attained without an effort. It is one of the latest theories of the experts that, for financial or other reasons which are not clear to us, Wren's plan of construction was modified after the work began. The lines of the old foundations had to be avoided; the soil presented special problems—as our committee lately told us, "the ground would not be considered altogether satisfactory at the present time for a building of this character"; and as a result the Dome settled nearly six inches towards the south-west, the great piers sank, the weights were unevenly distributed, and the south-west pier (which we have now practically rebuilt and which is stronger than it ever was before) was badly shattered, and had to be repaired by Wren himself. The foundations of this immense structure are only four and a half feet below the level of the crypt floor. Beneath the strip of earth on which they rest, there lies a bed of sand and gravel, with the blue London clay far below. We are assured that there need be no special anxiety about the foundations at present; but Wren, of course, could not have foreseen that the time would come when, as in 1831, great quantities of sand would be pumped out from beneath the Cathedral with a view to constructing a deep sewer near the south porch. He could not have foreseen the elaborate drainage system of modern times; the vibration of motor traffic, with an effect upon the building which is still a matter of dispute between the theoretical physicist and the practical architect and engineer; the atmosphere of modern London, destructive alike of stone and of metal; or the risk of his foundations being undermined not only by the tunnels of tube railways but even by the basements of neighbouring warehouses. To one danger indeed, which we think he might have

foreseen, he does not appear to have given sufficient thought, and that was the peril of rusting iron. He made a note somewhere that iron should not be employed within nine inches of the air: yet we have found it largely used throughout the building, and with disastrous results. It has to be remembered also that Wren, compelled to convey his Portland stone by sea, found the greatest difficulty in maintaining a regular and adequate supply; had it been otherwise, the Dome might have stood unshaken; as it was, his great piers were filled with rubble, and the Portland stone on their surface is in places but a few inches deep. And, as he was curtailed for material, so he was continuously handicapped by want of means. The cost of such a Cathedral was immense, and, in spite of Sancroft's assumption that "money will be had to accomplish it," funds came in but slowly. Wren himself contributed the sum, not inconsiderable for those days, of £60. His committee did not help him greatly: it was critical and vexatious, and as unimaginative as committees generally were and are. He was accused of shirking his duty and of wasting time. In the end he was expelled from his office as Surveyor of Public Works. At the present day it may comfort us a little to learn that the appointment of his successor was regarded as due to "German intrigue."

But the old man was not dissatisfied. In the face of much adversity he had built his Dome more or less according to the pattern shewed to him in the mount. Ours is the lesser but still serious task of preserving what he created. "Parentalia" (now a somewhat discredited authority) tells us that he aimed at building for eternity; he is also said to have prophesied that his work would last for 200 years. After 200 years the

Cathedral still stands in massive strength—perhaps a little like some ancient tower which the encroaching sea-waves threaten to undermine. Our purpose is to take no avoidable risks with such a Dome as ours, nor to bequeath to another generation a task which, through carelessness or negligence or want of generosity or courage, might soon have become impossible. We are thinking not of to-morrow but of the years to come.

I once suggested that a memorial to Christopher Wren should be placed somewhere in the City on which his genius has left so deep a mark ; and a friend guaranteed a princely sum sufficient to carry out the design on a noble scale, so that the people might know how great a man had walked their streets. Then came the war ; and the structural needs of the fabric loomed so large that it seemed unfitting to divert time and money and effort to something purely ornamental. The best memorial of Wren is still the Dome which lifts its misty splendours above the curves of the river, with the Cross shining back to the setting sun. As, in a quiet corner of the crypt, we read once more the epitaph above his unpretentious grave, we repeat with pride and contentment the familiar words, " Si monumentum requiris, circumspice."

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Oxon. 28. May. 1700 7

We the Mason Carpenter and Smith have according to our direction made enquiry into the Buttris at the East end of the Divinitie School, And doe find the ffoundation to be very firme and good, and cannot think that any failure in that School does proceed from that part.

About 32 years since, Sr Christopher Wren observing some failing in the roof of the said School, did order the Springers of the Arches to be Screw'd up, and Anchor'd through the Walls, which was done according to his direction, wth good Success, all things standing true in those parts ever since.

About 8 years past, It was observed, that in the roof of the Library over the Divinitie School, most of the great Beames were fled from the Wall, That by the Order of the Revers Dr Aldrich the then Vice-Chancellor they were Anchor'd on both sides, And it has since been Observ'd, that the roof being tied up very tight, and the School being soe likewise below, has caused some bulgeing out in the middle as we have prov'd by our plumbing of it.

It is humbly offer'd to consideration, whither the Anchoring of those Beames that lay upon the Crownes of the Arches of the Divinitie School may not be a great securitie to the roof of the said School? And if allow'd,

The Workmen will undertake the doeing of it, without any knocking, or otherwise shakeing the Arches, and will with care Observe their directions, in wedging & pointing the said roof in all parts where there is occasion, and doe their utmost to preserve the Beauty of the said roof.

Thomas Robinson } Mason
George Smith } Carpenter
Thomas Young } Smith

Report of University Workmen.
(From the Bodleian Library.)

JOHN S. HOUGHTON

3/31

Whitehall June 20th 1700

53

I received yours of June 11th with the Workmens opinion upon view of some defects in the Divinity Schoole & Mr. Vice-chancellors desire that I should give my thoughtes about it: I have accordingly considered the Workemens proposition wch is to Anchor the Beames of the Floor that lies upon the Crownes of the Arches; If the Buttresses have not stirred below, I cannot see of what great use this can bee, though it may adde something to the security of the vault: The fault is in the swelling out of the Wall in the Library, & this proceeds from the ill manner of framing auncyently used in Roofes; instead of Truffing up the Beames by the principalls they put Bracos under, framed to a post, wch rested upon a Corbell in the Walls, soe the weight of the Roofe pinching the Bracos presses outward the Walles. But I am perswaded this fault is an auncient as the first building, & will never goe farther unlesse a Beame perish or sinke from its first position through the breaking of the Tenons, I take this for a principle that what is once in Equilibrio doth allwayes rest soe unlesse the perishing of the Materiall induces a new motion or violence from without. I desire the workmen would exactly take the Section of this fabric by a scale, & that they would more particularly examine what the distance is of the postes from the Wall, how farr the wall is gon off from the timber, & the manner of the framing: I can then give a more certain account; though I am apt to thinke this was soe from the beginning while both the walls & the Timber were green, I confesse I thought soe 30 yeares agoe: but I may be of another opinion & therfore I desire a new section, I may possibly find something necessary to be don to the roofe.

my most humble service to Mr. Vicechancell. I am Yours very humble Servant Chr. Wren

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